THE PAPER INDUSTRY and PAPER WORLD

N EDUCATIONAL NEWS MAGAZINE—JULY, 1944

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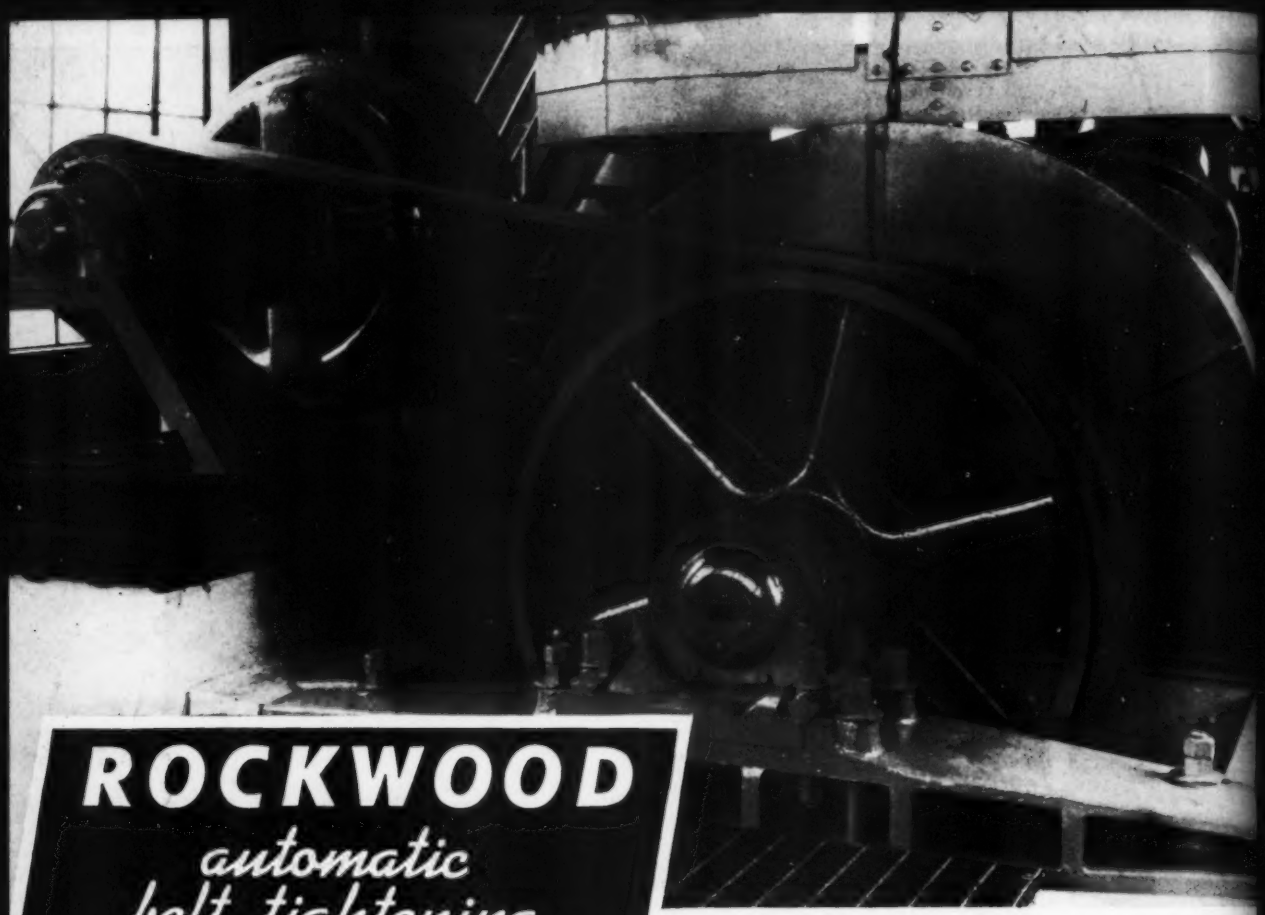


ROCKWOOD
automatic belt tightening
MOTOR BASES

350 h.p. No. 16 Rockwood pivoted motor base on chipper at Southland Paper Mills, Inc., Lufkin, Texas

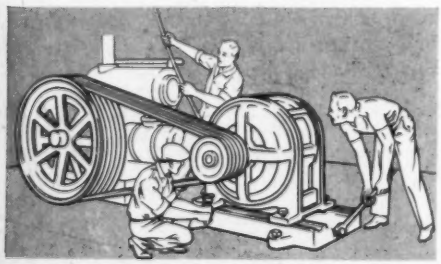
IMPROVED CHIPPER PERFORMANCE

Your chippers will have more capacity and do more work per hour if Rockwood automatic belt tightening motor bases are under the motors.

Then whenever the load gets tough the belt is automatically tightened to match the load—slacking off again when the load becomes less. There is practically no belt slip with flat belts or V-belts—when Rockwood pivoted motor bases are used. The life of the belts is usually doubled and there is less maintenance — as the drives operate automatically with little attention.

The same drive is equally beneficial to beaters, pumps, fans and other paper mill machines. But because the output of chippers is measurable you can see the improvement in chipper performance immediately after installing the Rockwood Drive.

Bases or complete drives available and delivery is prompt. For any size motor. Order from the factory or from your nearest Rockwood dealer. Rockwood dealers carry complete stocks of Rockwood pivoted Motor Bases, Rockwood V-belts and Sheaves and Rockwood weatherproof Paper Pulleys.



The Rockwood automatic belt tightening motor base makes manual belt takeups pictured a thing of the past. Always costly, usually overtime, and hard on the belts manual belt takeups have been a nuisance. The Rockwood Drive handles belt takeups automatically and the motor seldom has to be moved.

ROCKWOOD
INDIANAPOLIS • U.S.A.
Specialists in Power Transmission Equipment Since 1884

Beloit Believes . . .

Beloit believes that when the lights go on again all over the world, the American Way of Life will loom brighter than ever before! Beloit believes that only Americans themselves can stand in the way of America's dynamic future. And Beloit believes that the heart of America is the Free Enterprise system, which has established a way of life that is the wonder and envy of the entire world!

Buy War Bonds for Victory!

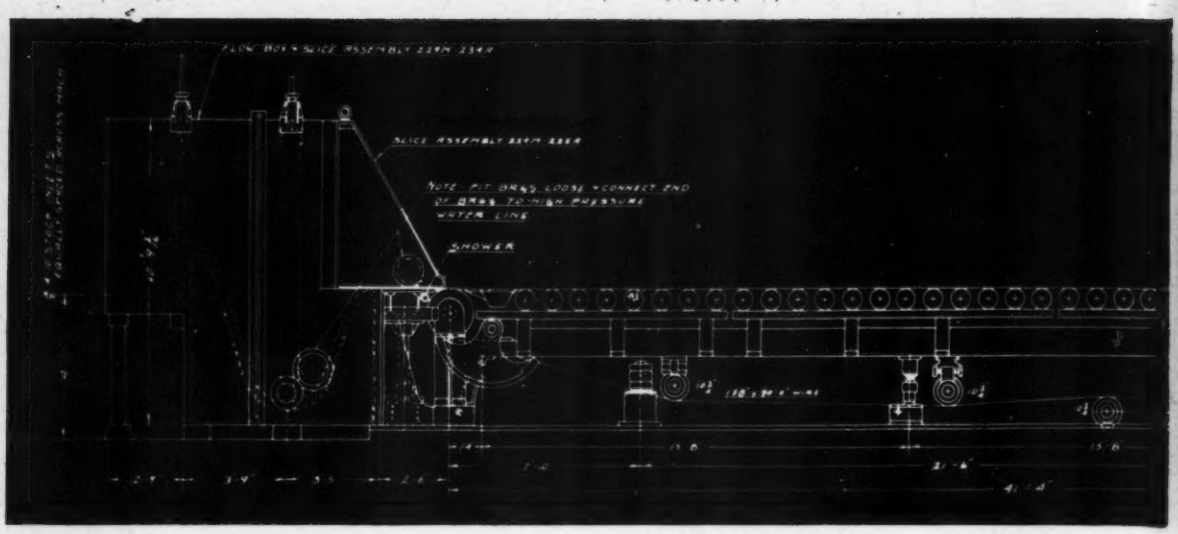
BELOIT IRON WORKS · PAPER MACHINERY · BELOIT, WIS., U.S.A.

SERVING UNCLE SAM · 1ST · FOR THE DURATION

BELOIT

BELOIT IRON WORKS, BELOIT, WIS.

WHEN YOU BUY BELOIT . . . YOU BUY MORE THAN A MACHINE!



How to combat Corrosion on Fourdriniers

When planning essential replacements and future fourdriniers, consider these advantages of Monel:

1. Corrosive paper stocks and white waters as usually encountered have little or no effect on this high nickel alloy. There is no pitting...surfaces retain their original smoothness. The results shown in the table at the right are typical of Monel's corrosion resistance.

2. Under exposure to the corrosive conditions generally met, Monel is used safely in combination with bronze and copper fourdrinier parts.

3. Monel is both stronger and tougher than mild steel. Its resistance to sagging is practically twice that of brass.

4. Any of the commonly used methods may be employed for welding, soldering or brazing. In addition, Monel is readily machined, drawn or forged.

Ask our technical staff for assistance with your problems. Among the helpful publications available are *"Selection Guide to 28 Problems on Fourdriniers"* and Bulletin C-3 *"Monel, Nickel and Inconel in Pulp and Paper Mills."* Write for copies.

PRINCIPAL USES OF MONEL ON FOURDRINIER WET ENDS

Flow Boxes—Monel linings from .037" to ⅛" thick are applied to wood or steel boxes. Some are of self supporting Monel sheet construction, or built from nickel-clad steel.

Flow Box Midfeathers—Wood construction lined with .037" to .062" Monel sheet.

Apron Plates—Monel strip from 1/16" to ½" thick, supported by steel frames.

Slice Blades—(flat bar type and flexible slices). These are of ⅛" to ¼" thick, special temper cold rolled Monel strip. Flexible slice lips up to 250" long are supplied.

Breast Rolls—Steel rolls covered with ⅛" to ¼" Monel provide wear and corrosion resistance as well as high stiffness at relatively light weight.

Table Rolls—Monel seamless tubing for diameters up to 5". Monel-covered steel tubes for larger diameters.

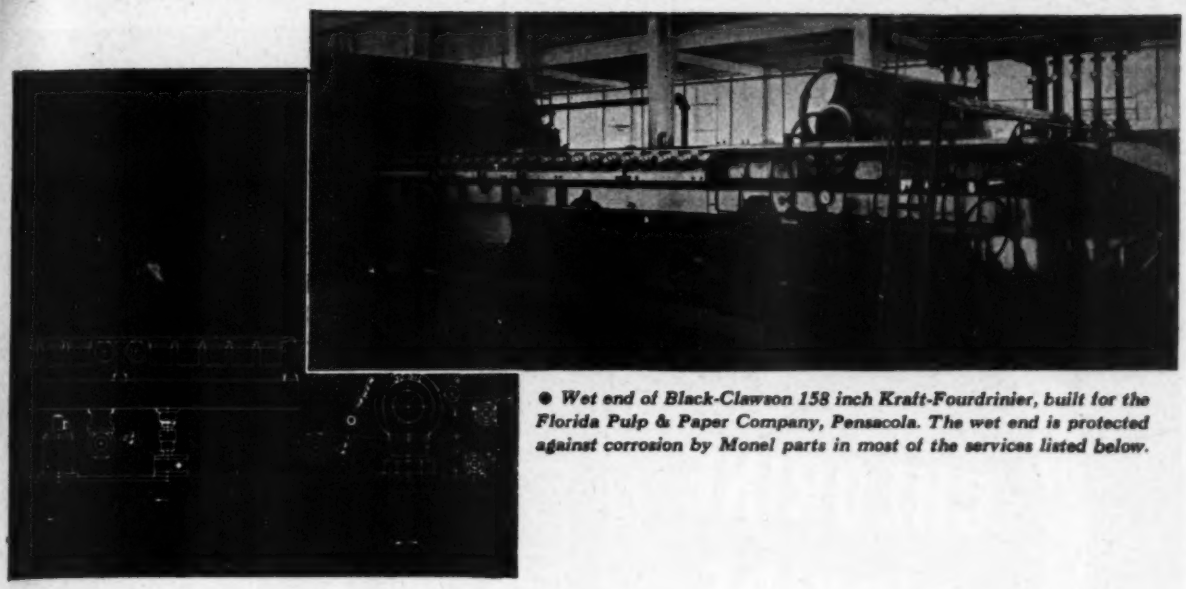
Dandy Rolls—An especially rigid and corrosion resistant roll body is built from Monel strip and wire with Monel wire cloth facing.

Suction Boxes—Boxes welded from ⅛" and ¼" Monel sheet are strong and of light weight.

Suction Box Covers—Monel covers have been used 2 years and more without resurfacing. Covers are made from ¼" thick full hard temper Monel strip.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK 5, N. Y.

Monel



● *Wet end of Black-Clawson 158 inch Kraft-Fourdrinier, built for the Florida Pulp & Paper Company, Pensacola. The wet end is protected against corrosion by Monel parts in most of the services listed below.*

Wire Return Rolls—Monel covers (⅛" thickness) over steel tubes. Roll covers are ground to finished diameter.

Fourdrinier Rails—.037" to .050" Monel sheet lined steel or cast iron rail construction.

Fourdrinier Side Beams—.037" to .050" Monel sheet lining over steel or cast iron rails.

Shaker Springs—"Z" nickel of full hard temper and age hardened is used for flat spring leaves of shakes with high stroke frequencies.

Save-All Trays and Pans—.062" to ⅛" Monel sheet is used generally for strong, durable, welded construction.

Cross Braces—.025" to .037" Monel is used for lining steel pipes.

Fourdrinier Brace Rods—Cold drawn Monel rods.

Remover Cross Drive Shafts—Cold drawn Monel rods.

Remover Beam Tracks—Gall resisting, high hardness cast "S" Monel for rollers or tracks; companion part is bronze.

Fourdrinier Remover Beams—.025" to .037" Monel sheet covered steel construction.

Shower Pipes & Nozzles—Seamless Monel tubing for pipes, and "R" Monel rod (200 BHN) for machined nozzles provide stiff and wear resisting showers.

Doctor Blades & Backs—Full hard Monel blades for bronze rolls. Monel sheet and angles for doctor back construction.

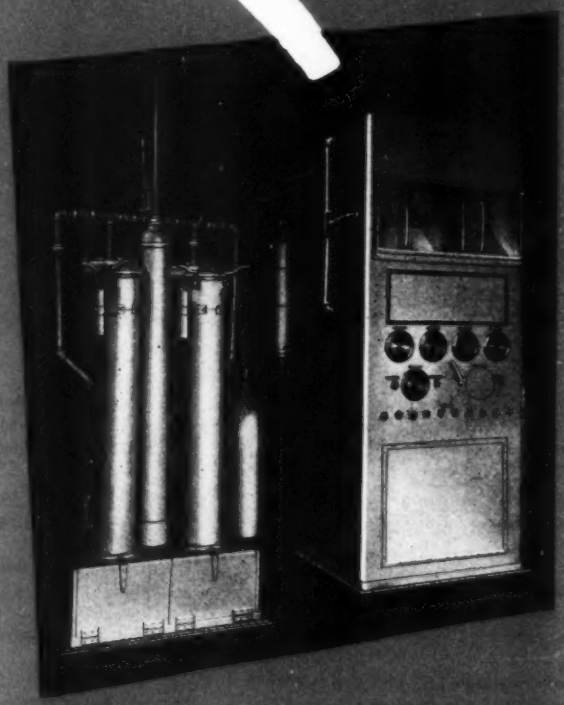
Bolts & Other Fastenings—Monel fastenings are used safely in combination with bronze or copper fourdrinier parts.

CORROSION RESISTANCE OF MONEL TO PAPER STOCKS AND WHITE WATERS OF FOURDRINIERS*

Paper Stock	*Location of Monel Specimen*	*Stock Consistency*	*pH of Stock*	*Temp.*	*Corrosion Rate in Inch Penetration per Year*	*Remarks*
DE-INKED PAPER stock containing small amounts of SO_2, CL_2 and H_2SO_4	Immersed in headbox Middle West Mill.....	.....	4 to 4.5	.....	0.0001	Smooth surface, no pitting
NEWS PRINT 80% groundwood, 15% unbleached sulfite pulp	Immersed in headboxes 3 Northwestern Mills.....	2.8% to 3%	4.7 to 5.1	85° F. Average	0.0003 to 0.0014	Smooth surface, no pitting
KRAFT alum treated	Immersed in headboxes Northern Mill..... Southern Mill.....	....	6.5 to 7 4.5 to 6	95° F. Average	0.0001 0.0005	Smooth surface, no pitting
SULFITE bleached pulp	In save-all trough Middle West Mill.....	0.1%	6.8	140° F. Average	0.0008	Smooth surface, no pitting
BOND AND STATIONERY 100% linen and new cotton, rosin and alum sized	In feed line ahead of machine screen Eastern Mill.....	0.5%	6.5 to 7.3	84 to 130° F.	less than 0.0001	Smooth surface, no pitting
CIGARETTE PAPER	In white water box connected with suction boxes Southeastern Mill.....	.....	9.0 to 10.0	66 to 75° F.	less than 0.0001	Smooth surface, no pitting

**Tests conducted by paper mills in collaboration with Inco Development & Research Division. Test method in accordance with ASTM specification A 224-39T.*

CHLORINE DIOXIDE now available to industry



2½ TIMES MORE POWERFUL THAN CHLORINE

Through Mathieson's new chlorite-chlorine process, this powerful oxidizing and bleaching agent is now available to you.

Already proven to have remarkable values, chlorine dioxide opens new opportunities for definite processing improvements:

- *in water treatment to remove tastes, odors.*
- *in checking blue mold in citrus fruits.*
- *in the processing and bleaching of starch.*
- *in multiple bleaching of flour.*
- *in bleaching of soap, paper, textiles and other materials.*

Controlled amounts of chlorine dioxide, without chlorine contamination, are secured by a safe and simple reaction. Equipment consists of a small generator filled with flaked commercial sodium chlorite and equipped with measuring devices for accurate control of chlorine and air flow. You simply generate chlorine dioxide as needed:

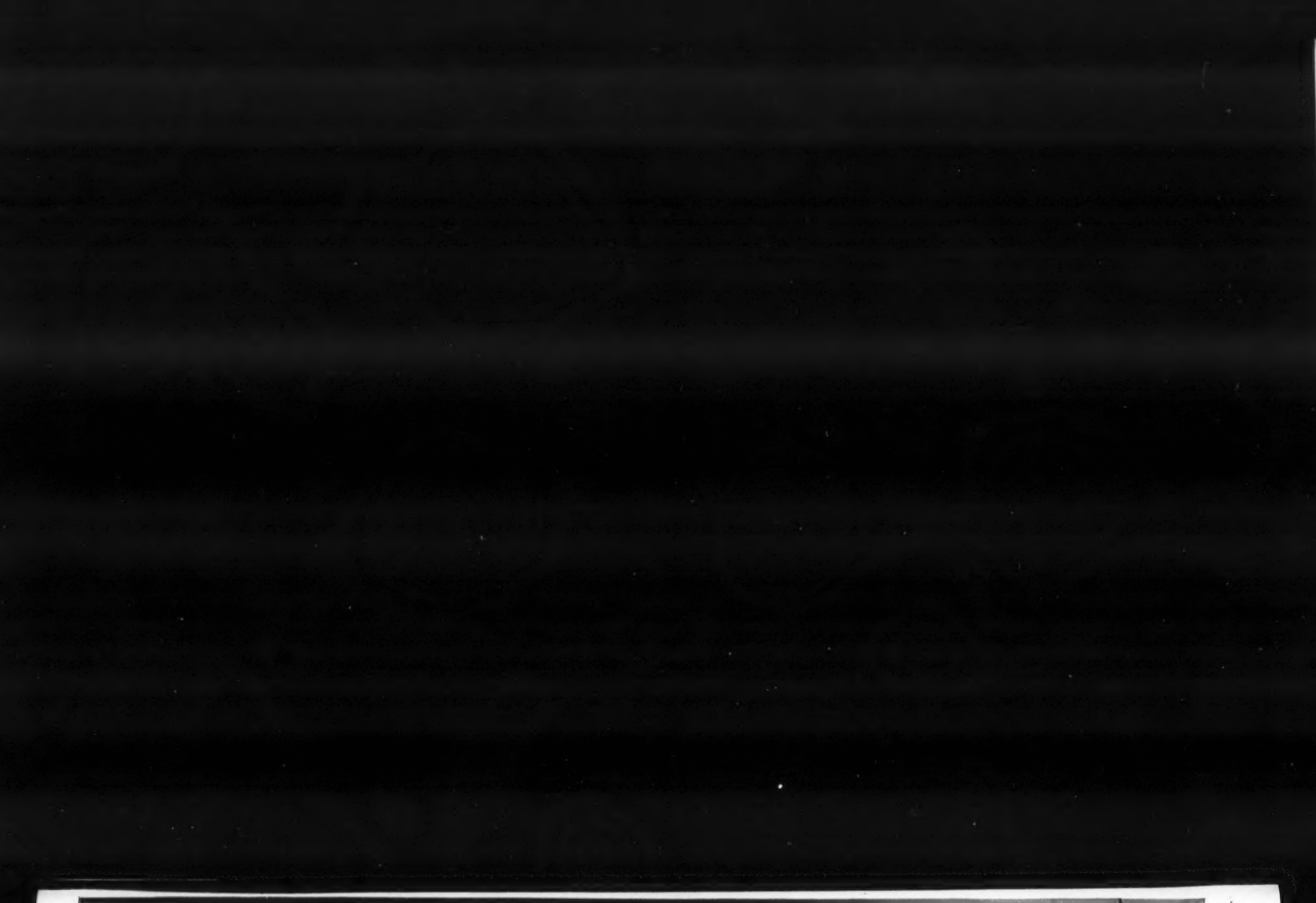
$$\underset{\text{sodium chlorite}}{2\ NaClO_2} + \underset{\text{chlorine}}{Cl_2} \longrightarrow \underset{\text{chlorine dioxide}}{2\ ClO_2} + \underset{\text{salt}}{2\ NaCl}$$

Our technical service department will be glad to furnish information on the use of chlorine dioxide in your particular operations.

Mathieson
CHEMICALS

THE MATHIESON ALKALI WORKS (INC.) 60 EAST 42nd STREET, NEW YORK 17, N. Y.

CAUSTIC SODA . . . SODA ASH . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . AMMONIA, ANHYDROUS & AQUA . . . HTH PRODUCTS . . . FUSED ALKALI PRODUCTS . . . SYNTHETIC SALT CAKE . . . DRY ICE . . . CARBONIC GAS . . . SODIUM CHLORITE PRODUCTS . . . SODIUM METHYLATE



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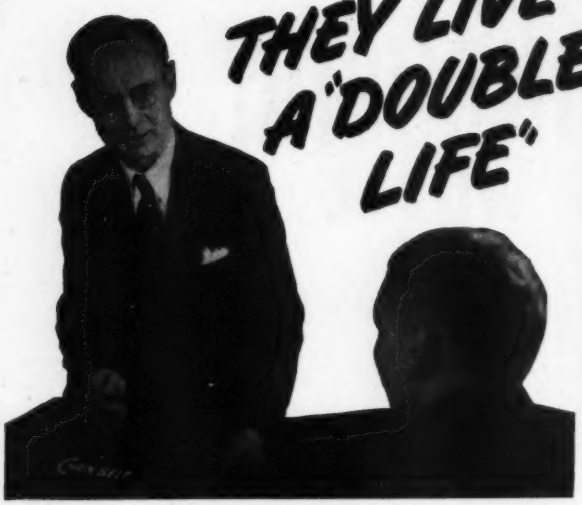
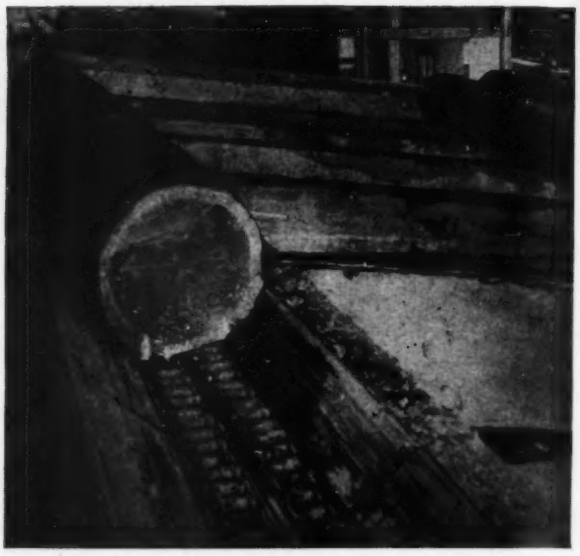
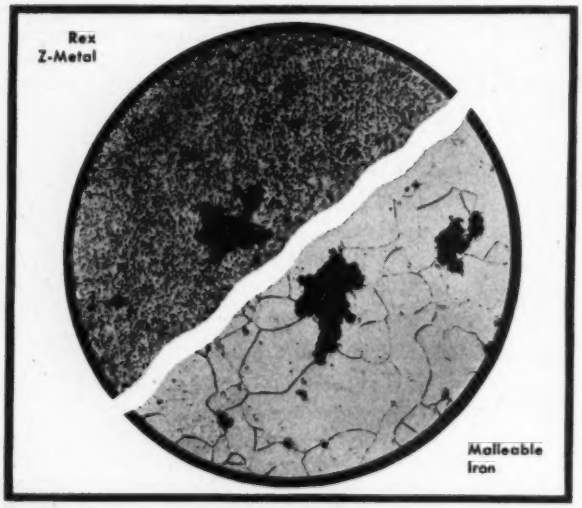
THEY LIVE A "DOUBLE LIFE"

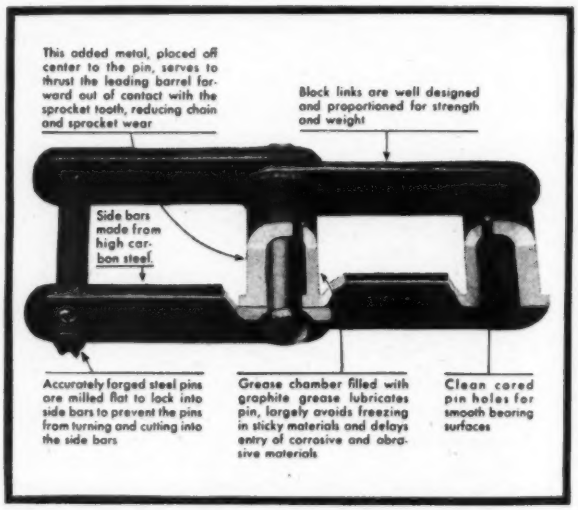




❶ "DOUBLE AND THEN SOME! Why, in mill after mill, Rex Z-Metal chain belts have operated more than double the life span of ordinary chain belts. In dusty, moist or corrosive operating conditions, they can't be beaten for economical, trouble-free service."

❷ "Z-METAL'S THE ANSWER where loads are extra heavy or where corrosive conditions are a problem. Just note this installation photo. Grueling service such as this lumber mill log conveyor has to take, is child's play for Rex Z-Metal chain belts.




This added metal, placed off center to the pin, serves to thrust the leading barrel forward out of contact with the sprocket tooth, reducing chain and sprocket wear
Block links are well designed and proportioned for strength and weight
Side bars made from high carbon steel
Accurately forged steel pins are milled flat to lock into side bars to prevent the pins from turning and cutting into the side bars
Grease chamber filled with graphite grease lubricates pin, largely avoids freezing in sticky materials and delays entry of corrosive and abrasive materials
Clean cored pin holes for smooth bearing surfaces

❸ "THIS PHOTOMICROGRAPH (200 X magnification) clearly indicates the uniformity of Z-Metal's grain structure. The small spheroidal particles in the Z-Metal are iron carbide. They and their relation to each other impart the greater strength and hardness to Rex Z-Metal."

❹ "AND FOR REAL TOUGHNESS, combine the strength of Z-Metal with the features of Rex Durobar chain belt, a big favorite in the lumber industry with its famous off-center design and reinforced barrels. It's even more popular when cast in Z-Metal."

* * *

Rex Z-Metal chain belts are the answer to any drive or conveying problems involving heavy load or corrosive conditions. The Rex Man can help you with your chain belt application problems. For chain belt engineering data ask for the 768-page catalog No. 444. Chain Belt Company, 1717 West Bruce Street, Milwaukee 4, Wisconsin.

REX CHAIN BELTS

More than 2000 sizes and types for the positive transmission of power, timing of operation and conveying of materials

CHAIN BELT COMPANY OF MILWAUKEE

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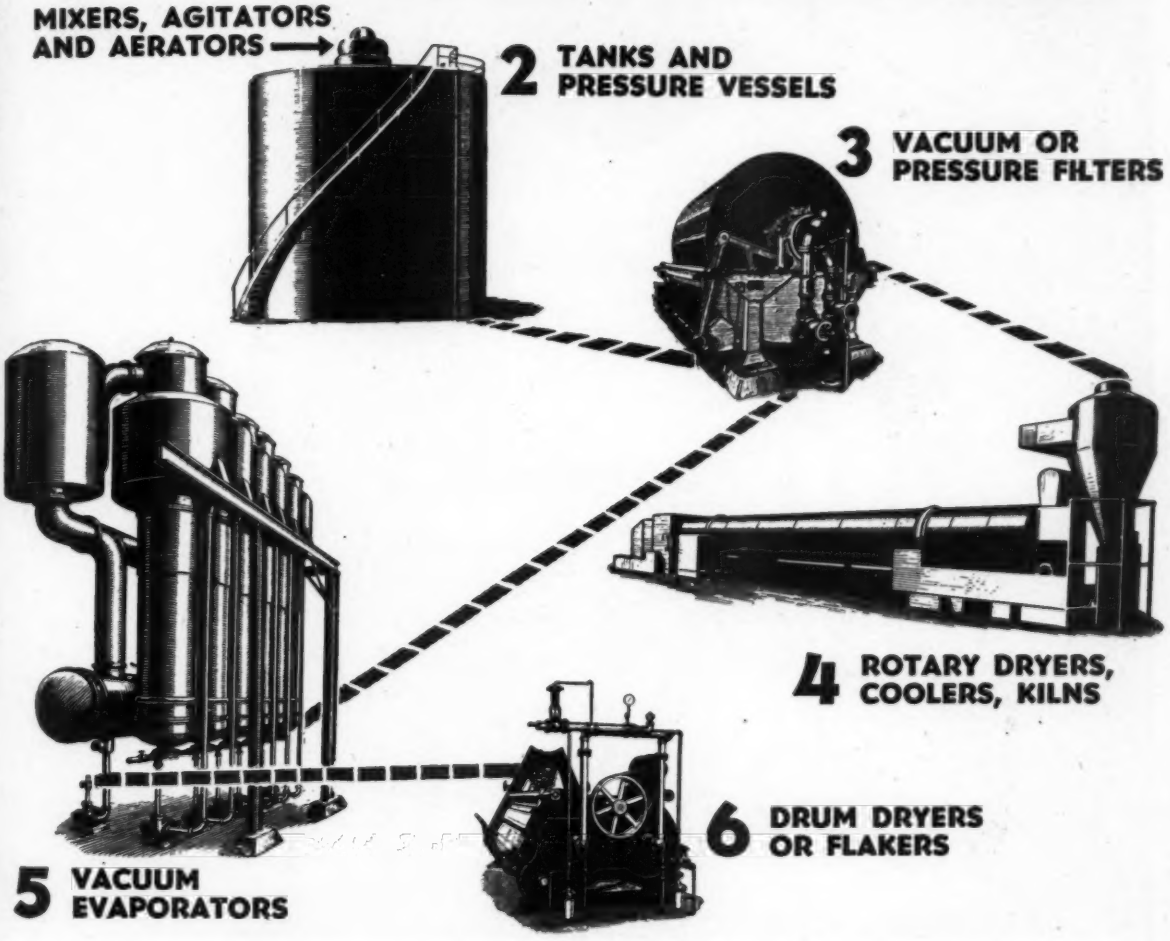
If you need any of this PROCESS EQUIPMENT


MIXERS, AGITATORS AND AERATORS
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5 VACUUM EVAPORATORS
6 DRUM DRYERS OR FLAKERS

Whether you need a complete new plant or merely one or two individual pieces of equipment, General American Process Equipment is geared to serve you—*now*. . . . This organization is composed of four outstanding manufacturers specializing in mixing, filtering, evaporating and drying of all kinds. Our group is also associated with one of the nation's best-known specialists in welded fabrication—the Plate and Welding Division of General American Transportation Corporation.

This amalgamation does far more than strengthen each of our individual units. *It enables us to offer you a combination of engineering skills and manufacturing facilities which we believe to be unequaled in all America.* Give us the opportunity to prove it. Address:

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A Division of

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Composed of: LOUISVILLE DRYING MACHINERY CO. • THE TURBO-MIXER CORP. • CONKEY FILTER COMPANY • AMERICAN MACHINE COMPANY

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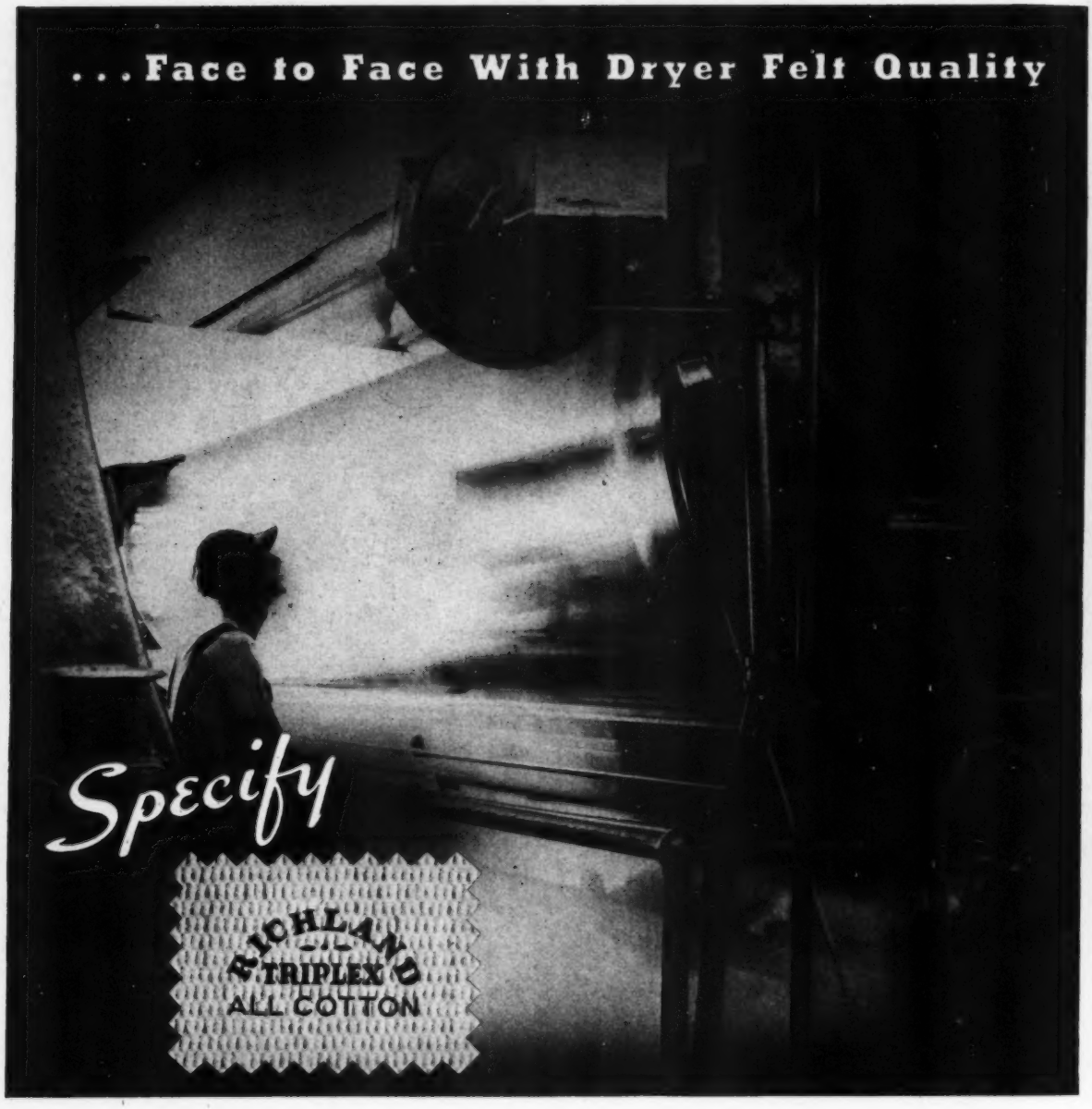
New York . . . CHICAGO . . . Sharon, Pa.

. . . Face to Face With Dryer Felt Quality



When you face the facts about RICHLAND TRIPLEX all cotton dryer felts you will find it difficult to specify anything else. A high degree of uniformity gives them particularly tough long-wearing contact surfaces. They also possess a high degree of porosity with minimum amounts of shrinkage and stretch. When you think in terms of dryer felt costs specify RICHLAND TRIPLEX all cotton heavy duty felts.

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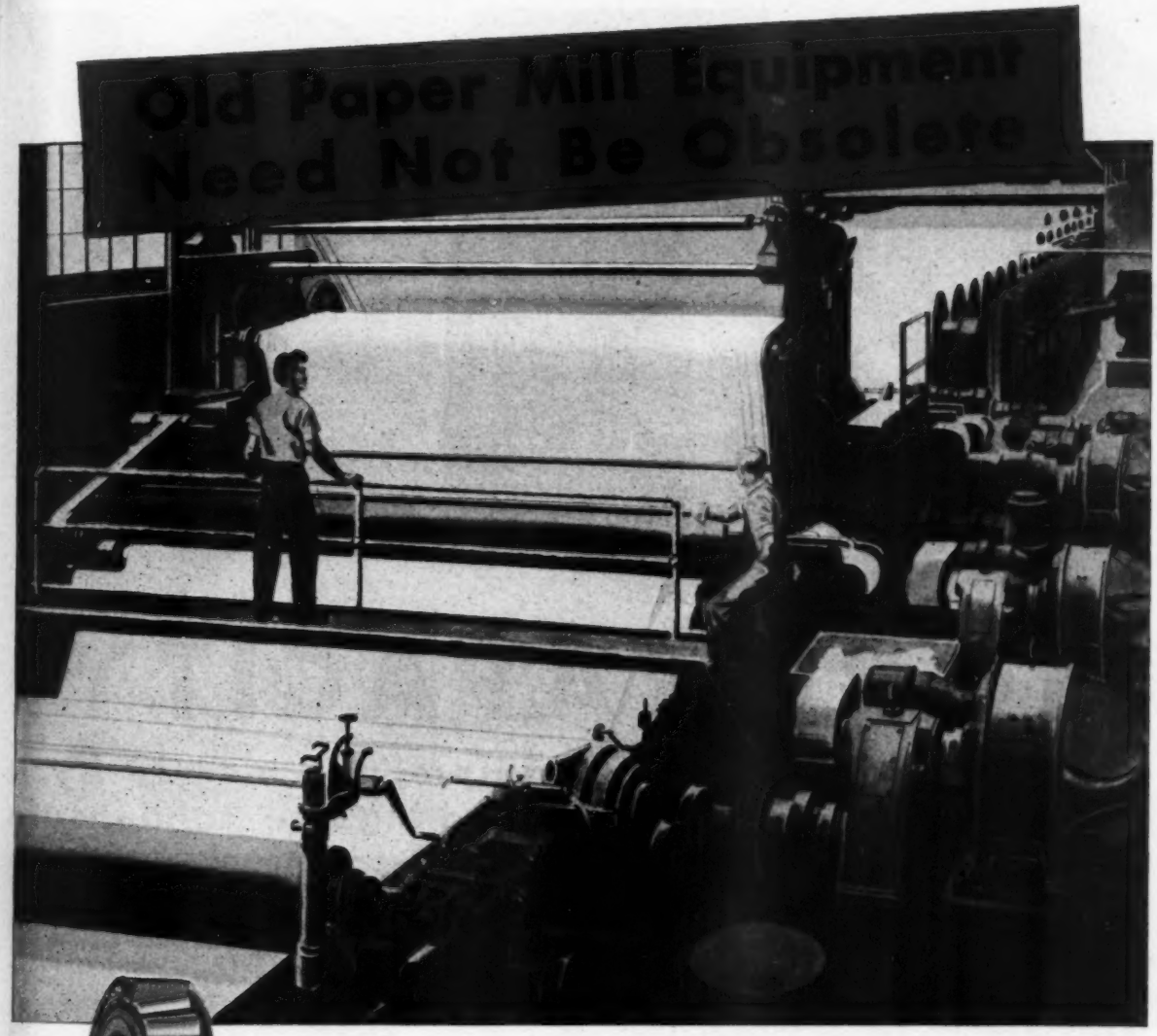
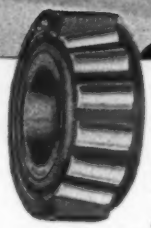




You are not getting all you can get in speed, precision, endurance and economy unless your equipment has Timken Tapered Roller Bearings at every point of friction and hard service. You still have something coming and now is the time to go after it.

Check up on the rotating parts of your machines that are not protected by Timken Bearings against friction; wear; radial, thrust and combined loads and misalignment. Every one of these bearing points represents a loss in efficiency and an increase in operating and maintenance costs.

Replace existing friction bearings with Timken Bearings wherever you find them and watch production go up as costs go down. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

25%

MORE CAPACITY!

From the same process equipment—merely by a change in the method of handling the condensate

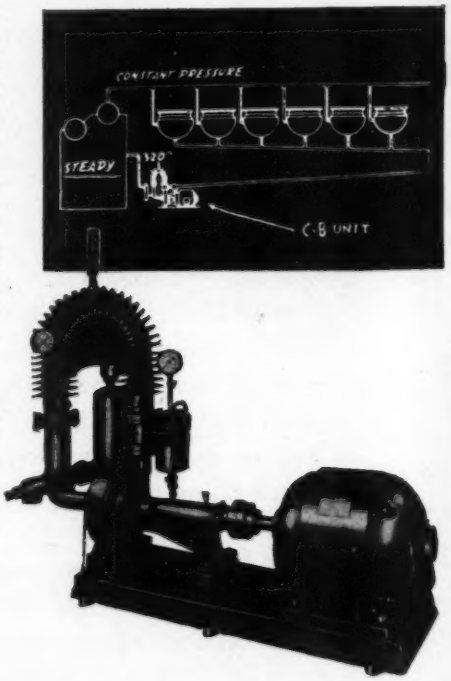
Are you interested in increasing production—and at the same time saving fuel? Of course you are! That is why you are sure to be interested in the Cochrane C-B System of High Pressure Condensate Return.

The results from the installation of the C-B System in processes using steam for cooking or drying are simply amazing. Fuel Savings up to 25% are not only possible but have often been exceeded. Production increases equally high are common and time savings and labor savings add to the overall economies.

Why shouldn't these savings be yours? The method of securing them is simple. You merely change from your open system of condensate return to the C-B Closed System installing the C-B unit, consisting of JET-pump, priming loop, strainer and air separator. Because the system is closed, there is no flash loss and condensate is returned to the boiler at close-to-process temperatures.

Dozens of enthusiastic letters on file show how many leading manufacturers have increased production, saved on fuel costs, raised the quality and increased the uniformity of that quality. These results are a matter of record and are merely indications of what can be done.

The wise manager looking to post-war competition will investigate the C-B System NOW. Write at once for complete information or consult our nearest representative.



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COCHRANE C-B SYSTEM

CONDENSATE RETURNED TO BOILERS AT HIGH PRESSURE AND HIGH TEMPERATURE

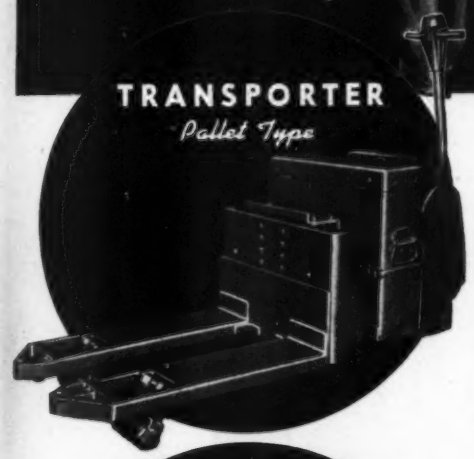
Automatic
TRADE MARK
TRANSPORTER

Tons

TRANSPORTED BY SIMPLY GUIDING THE LOAD

Women transport tons with no trouble at all—in fact inexperienced help becomes efficient with a TRANSPORTER. This battery powered equipment not only offers you an immediate answer to manpower shortage but does a remarkable job of speeding up the work and cutting handling costs.

The trucker simply guides the TRANSPORTER and walks along with the load. Forward or reverse movement—complete brake and speed control at operator's finger tip. Wide turning range — maneuverability in close quarters. Write for complete details.



★ Model "P-427" 4000 Pound Capacity Pallet Type "TRANSPORTER" Fork Lift Truck. Standard Established Fork Lengths are minimum 30" to 60" maximum in 2" steps. Standard Fork Height in low position is 3⅛". Lifting Height from low to high position is 3¾"

★ Model "TN-4 and TW-4" 4000 Pound Capacity and Model "TN-6 and TW-6" 6000 Pound Capacity "TRANSPORTER" Platform Type Lift Trucks for Skid Platforms. Standard Platform Lengths 36" to 72" in 12" steps. Width 20" and 26½" —heights in low position 6", 7", 9", 11".

- Positive mechanical brake
- Controls in steering handle
- Forward and reverse speeds
- Front wheel power drive
- Shockless hydraulic lift with easy foot control
- "Dead-Man" Control

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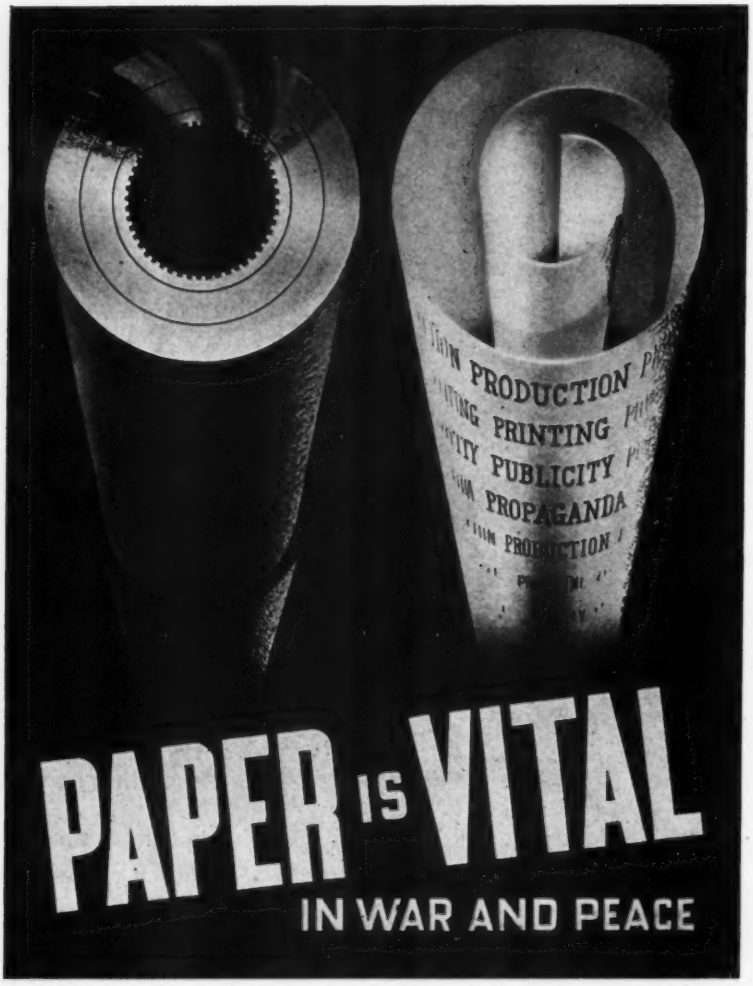


Our armies have made D Day a historical military event. They now push on toward V Day, the day when the enemies of freedom and peace shall have been utterly and permanently conquered. Paper is in the war—it follows the guns and shells into the battle front; it comforts and protects our soldiers every day. When V Day comes, and our armies return home, there will be no armistice for Paper—Paper is vital to peace.

TRADE WINDS

☆

The Factory of the Future

▸▸▸ The H. K. Ferguson Company, of Cleveland and New York, recently released its findings from a research study, conducted during the past year, on "The Factory of the Future."

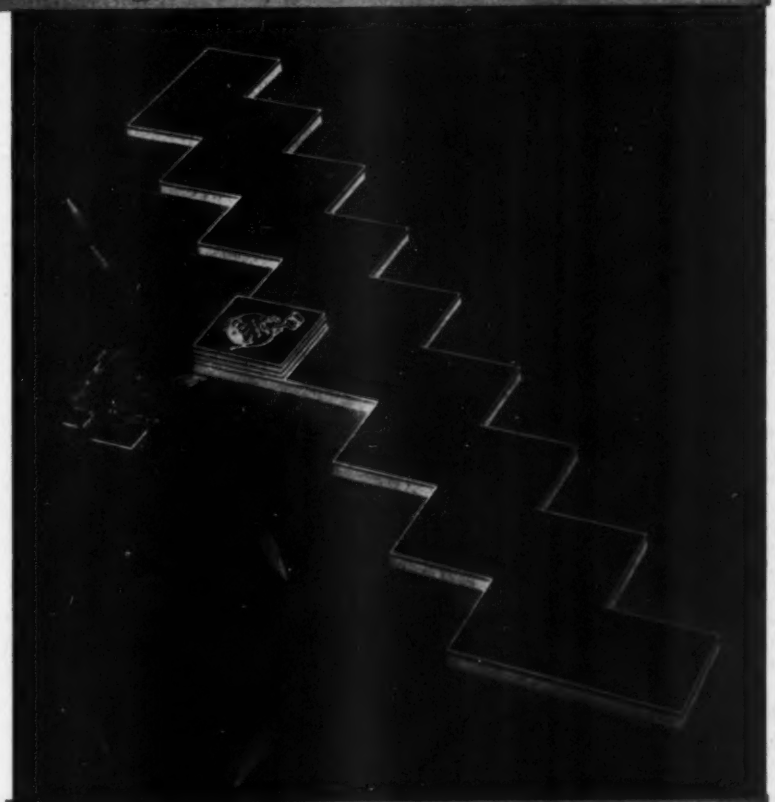
The research study has been carried on by leading members of the Ferguson organization. Many operating officials of plants, built in the past by The Ferguson Company, also participated by lending information gained from actual production experience.

"The Factory of the Future is important to almost seventy-five million Americans whose livelihood is earned from industry," the foreword to the report on the study states. "World War II has already made marks and stains on our production pattern. The Factory of the Future will be influenced by them. (Quoted passages are from the report).

"Nor will the transition be rapid; it will take years. . . . But there are certain unalterable facts that are already clear—it has been our task in this study to project them into the future. We have taken our job seriously. We have used our imagination—but it has been engineered into down-to-earth terms of real buildings that can be built now!"

The report raises a number of questions in the design and construction of industrial facilities, and "the suggestions for The Factory of the Future have been guided almost on a single thought—to make the factory a community asset rather than a community liability."

Topics covered in the report include the coming importance of the air view of the factory, night architecture, benefits of the parkway approach to the plant, added conveniences for personnel, the interior treatment of the factory, boiler house improvements, and basic layouts for typical manufacturing plants.



Artist's conception Factory of the Future, night view from the air . . . .

The Air View

"The Factory of the Future will have a definite place in the air age of tomorrow. As air travel becomes more and more popular, the 'air view' will assume increasing importance. Particular emphasis will be placed on this concept by manufacturers of consumer products, who will, in the air age, have the distinct opportunity of presenting in a moment a vivid sales story that can last a lifetime.

"The 'factory from the air' therefore looms as an entirely new consideration in the approach toward designing the manufacturing and assembly plant of the future. It is a new 'elevation' that may be treated perhaps in time, with the care of a front facade. Just what is the best method of presentation? Can it be done with isolated buildings? Do monitor or sawtooth roofs give the best air impression? Or, is there a new, untried layout best suited to do the super good-will job in the shortest possible time to potential customers traveling from five thousand to eight thousand feet above the ground?"

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Night Architecture

"Night architecture, will require new treatment in the design of The Factory of the Future. We have already given negative thought to the problem in the construction of "blackout' war plants. There is a positive approach."

The report points out that the appearance of a busy factory at night can have definite good-will and advertising value, because a community takes pride in an attractive industrial development.

The Parkway Approach

The section devoted to the parkway approach to the plant indicates that traffic handling is of major consideration in a good industrial relations program.

"The work week is becoming shorter for many reasons. Not unimportant among them is that employees want to get away from their work as much and as quickly as possible. They want easy access to their job sites in the morning—they want to sleep rather than waste half an hour parking and walking from their cars. Delays in coming to and going from a factory sometimes total several hours per week; it is not necessary. A parkway treatment of approaches to and from a plant can eliminate most of the wasted time.

"Workmen also should be able to park as closely as possible to their work locations in the plant. Most plants now have one large area for parking and it is not uncommon for an employee to walk a mile or more in inclement weather to get to his automobile."

The Personnel Department Is Here to Stay

"Time has come for us to make up our minds that the personnel department, representing extra consideration for the employee, is here to stay. Time has come, too, for us to realize the importance of employee morale and its value in dollars and cents to any management.

"Industrial relations' facilities have continued to increase since the early days of Samuel Gompers. But never at such an accelerated pace as during the past several years when employers found that they must 'sell' their jobs to prospective employees. Workmen go to plants where working conditions are better or where pay is markedly higher. Good workmen in the future will follow the same trend.

"World War I put women in the office—and they stayed. World War II put them in the factory—they'll stay there too. The ratio of men to women in a plant will determine the extent of niceties. We already have many examples in some of our newer industrial facilities.

"Health centers already have an important place in the factory. They are relatively new, and the tendency is to expand rather than retract the services they offer. Nurseries and play areas for workers' children, and solariums for themselves, are in the offing. Shopping centers are another item for larger plants because many women who work will still be responsible for a household, and working hours conflict with downtown shopping hours."

Interiors

"The interior of The Factory of the Future will be 'hospital clean.' There will be clear, wide, unobstructed floor space which lends itself to any adaptations in equipment. Walls and ceilings will be flush. Connections to machines will come from underground service tunnels which also carry piping and conduits. Air conditioning and dust collecting equipment will maintain healthful climatic and atmosphere conditions at all times, with a proper differential between inside and outside temperatures.

"Lighting techniques will always furnish a topic for discussion in factory planning. Lost controversial issue today is 'blackout' plants versus conventional plants with windows. In a few specialized processes, windowless factories are ideal; for average manufacturing and assembly, they are unnatural. Workmen complain of claustrophobia, and usually this complaint has an effect on their productivity.

"Noise is probably the greatest single distraction to workmen," according to the study. "Most of it is unnecessary. In the future, windows and walls will be inclined to deflect sound waves upward to an acoustical ceiling. Especially noisy operations will be conducted in soundproof rooms and foundations for such equipment as testing blocks and punch presses will be isolated."

The report forecasts improvements in floor construction and predicts for the future a plastic which may be applied easily and give lifelong wearing surface. Innovations are expected also in doors, and particular attention will be given to colors of floors, machinery, and walls in the plant. Another desirable improvement is a system of underground conveyors for removal of scrap and waste.

Elimination of Smoke

The report predicts the elimination of the boiler house as we know it today, and the substitution in its place of a source of power and heat which is clean, as well as economical.

Plant Layout

"The layout of any industrial plant should be governed by the function to be performed," according to the study. "There are, however, certain fundamental principles that are incorporated in the design of any plant, and there, too, is a 'typical' plant for a 'typical' industry.

"The Factory of the Future will be better adapted to an integrated correlation of sub-assembly units into the main production line. There are many ways to achieve this goal; one is through the use of relatively small units that fit naturally into a complete working pattern. In time, the circle may even replace the rectangle as a basic form."

In introducing its report, The Ferguson Company pointed out that present-day costs were not considered in the preparation of the study.

"We are hardly naive enough to believe that a manufacturer will build the Factory of the Future soon," the foreword states. "We know that costs would be high; we would never recommend it for the present. Time is the only remedy for high costs—science teaches us relatively quickly how to produce more and better for less. We shall keep our faith in the trust that this will happen in the building industry."

Consideration has been given to both labor and management in the preparation of the study.

The study was conducted under the active supervision of Egon Gerner, brilliant young architect, and Guy B. Panero, nationally-known mechanical engineer; both members of the Ferguson staff for a number of years.

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IMPROVEMENTS TO BOILER HOUSE AT BATHURST PLANT

Improvements are being made in the boiler house at Bathurst Power & Paper Company, Bathurst, New Brunswick. A pulverized fuel boiler having a capacity of 175,000 lb. steam per hour at 650 psi pressure and 730 Fahr. total temperature is being installed.

Also being installed are auxiliary equipment such as coal scales, feed pumps, pulverizers, ash handling system and automatic combustion control. The project also includes the erection of a brick chimney 10 ft. in diameter by 175 ft. high. This unit is being installed primarily to burn low-grade coal at high efficiency which will reduce the amount of coal required.

PAPER · · · America's 6th Industry

GAS FLIES IN PAPER TANKS

(NEWS ITEM: *Auxiliary paper gas tanks are being installed in P-47 Thunderbolts.*)

Auxiliary papier mâché tanks being installed in the bellies of P-47's are greatly increasing heavy bombers' chances of getting home safely. These paper gas tanks, that can be dropped off when empty, greatly widen the range limit for our high-altitude fighters.

Fibre containers for air cargo . . . paper bags to protect delicate magnetos . . . paper garbage containers to conserve critical materials . . . paper vests to keep flyers warm . . . New uses for paper, calling for new standards of lightness and toughness; new standards of quality in performance. New responsibilities—new opportunities for the Pulp and Paper Industry.

The men and production facilities of the Pusey and Jones Corporation are at war—and Industry at War is Industry thinking and working at hitherto unheard of speed. Many practical and technical advantages have been discovered by our Research and Development Committee while working on the problems of America at War. These will result in more efficient Paper Making Machinery in the future.

Puseyjones engineers will welcome the opportunity to work with you in your Post-War Planning. We have prepared three informative articles: "The Post-War Fourdrinier," "Development of Stream-Flow Vat System," "The Flow Spreader." Ask for reprints by name.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Wilmington 99, Delaware, U. S. A.

THE SIGN OF QUALITY

STRANGE PAPER COMPANY PLANT RAZED BY FIRE

The Strange Paper Company of Menasha, Wisconsin, wasted little time in resuming full operations following its disastrous fire June 13. The concern was in operation before the last crew of the fire department had left the scene.

Temporary offices are in the Lux building in Menasha (Wis.) and are expected to remain there for six months.

Plans call for rebuilding on the same location but it will take at least a month to clear the area of debris from the burning of the four story office and storehouse full of wastepaper. Two cranes and a fleet of dump trucks have been working since the fire hauling away the still smouldering refuse.

Joseph H. Levandoroski stated that it will take considerable time to estimate the exact loss. All company records were saved although many are water damaged.

Although operations are being carried on under difficulty the company is meeting its production requirements on its war contracts.

The fire, the second suffered by the concern in seven months, was a spectacular blaze which brought fire companies from Appleton, Neenah, Oshkosh, and Fond du Lac. It started in late afternoon and reached its peak at the same time a terrific thunderstorm struck.

Army officials closed the street which crosses the main bridge between Neenah and Menasha and passes directly in front of the main buuilding. Canals on both sides of the mill gave numerous pumpers a handy source of water. Fourteen hose lines played on the fire from three sides.

T. J. Russell, superintendent of the Sangamon Paper Mill in Kaukauna, Wis., has announced that company officials are making plans to rebuild the mill destroyed by fire several months ago. The plans are in terms of $200,000.

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Illustrations below show ravages of the fire which destroyed the John Strange Paper Company, in Menasha, Wisconsin. At the left is a view of the four-story offices and storehouse as it looked ten days after the fire. Two cranes are dropping still smouldering bales of wastepaper and then loading them onto dump trucks.

LATE DISPATCH! As this issue goes to press news is received that the box plant of Pacific Paperboard Company, Longview, Wash., was destroyed by fire on July 3. Favorable wind conditions saved the paperboard plant. (See item on page 428.)

Loss is estimated at $200,000, made up as follows: Machinery, $150,000; Stock, $25,000; Building, $25,000. The company immediately acquired a local foundry plant which will be equipped for box manufacture. The Longview Fibre Company has loaned the use of a folding box machine from storage.

It is reported the fire was caused when two men entered the plant surreptitiously during the holiday period to obtain honey known to be within the walls. A blow torch was used to kill the bees. The men obtained a quart of honey—the most expensive honey on record.

SO EASY . . . to keep your Seybold shipshape!

1. Just *once a day*—Lubricate drive shaft bearings, clutch and moving parts. Inspect cutting knife.

2. Simply *once a week*—Check the clutch and brake adjustment carefully and thoroughly.

3. Only *once a month*—Inspect the clamp pressure mechanism, and your Seybold will last for years.

Take a smart tip from the "Three Admir-ables" and see how easy it is to keep your Seybold sailing smoothly . . . because there are no new Seybold machines available under wartime restrictions, except on special approval of War Production Board. Needed repairs can be taken care of promptly through our nearest office.

Your Seybold was built with unusual endurance qualities. Treat it like a jewel.

SEYBOLD

• DIVISION •

HARRIS-SEYBOLD-POTTER CO., 823 WASHINGTON ST., DAYTON, F-7, OHIO

SEYBOLD SALES AND SERVICE

New York: E. P. Lawson & Co., Inc., 426 West 33rd St.

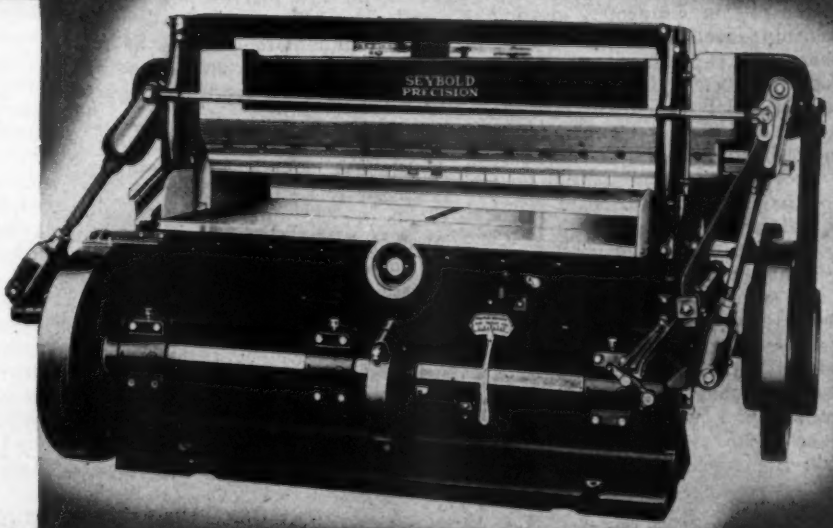
Chicago: Chas. N. Stevens Co., Inc., 112 West Harrison St.

Dayton, Ohio: Harris-Seybold-Potter Co., 823 Washington St.

Southern Sales District: Harris-Seybold-Potter Co., 220 Luckie St., N. W., Atlanta, Ga.

West Coast Distributor: Harry W. Brintnall Co., San Francisco, Los Angeles, Seattle.

Canadian Distributor: Harris-Seybold-Potter (Canada) Ltd., Toronto and Montreal.



May Pulpwood Up— Demand also is up

▶▶▶ While passing 1942 records for the second time this year, mill receipts of domestically-produced pulpwood in May were less than actual needs which have been increased by the invasion, the War Production Board reported.

Mill receipts of domestic pulpwood in May were 31 per cent higher than they were in 1943, the WPB stated, but warned: "However, May domestic receipts of about 1,216,000 cords were less than actual needs for domestically produced pulpwood during the period." Mill receipts of domestic pulpwood in May, 1942, were 1,214,000 cords.

Total receipts, including imports of pulpwood in May, were approximately 1,283,000 cords, showing an improvement of 27 per cent over the same month a year ago. However, they were 7 per cent less than receipts during May, 1942. Receipts of pulpwood from Canada totalled approximately 68,000 cords in May.

"In 1942 and 1943 paper mill operations were sustained far in excess of that justified by raw material import," the WPB said. "During that period, wood pulp inventory dropped about 600,000 tons, pulpwood inventory dropped almost a million cords, which is equivalent to about 600,000 tons of pulpwood, and waste paper inventory dropped over 300,000 tons. During this period, when we lost over 1,500,000 tons of paper-making material supply, paper was being consumed from wholesalers' shelves and from convertors' inventories at a rate far in excess of paper and paperboard production.

"Military demands for paper and paperboard to support invasion mounted tremendously. Such items as V-boxes, water-proof wrappings, invasion maps, etc., are taking tremendous quantities of fibre so that the amount available for civilian use is continually being reduced. In order to meet the increased demand put upon the paper and paperboard industry, still further improvement in pulpwood receipts must be obtained.

"Although receipts in May are higher than a year ago, it should be recognized that receipts during May, 1943, were abnormally low. In addition, in the Northeast, it must be taken into account that because of depleted mill inventories, there has been an accelerated movement of rough wood from the woods to the mills, without a corresponding increase in current pulpwood production in the woods.

"In the Northeast, where the pulpwood supply picture continues to be gravely critical, domestic receipts were about 11,000 cords higher than they were in April, and it is expected that mill receipts will continue to show the usual seasonal increase during June and July and indicated by the three-year average of the historical period 1941, 1942, 1943.

"Domestic receipts for the Lake States were about 85,00 cords less than they were in April. This follows the historic seasonal trend for this region during that period, and indicates that improvement noted in previous months is continuing.

"The Appalachian region domestic receipts were about 155,000 cords or 58 per cent above those of a year ago, when receipts were at an extremely low level.

"Mill receipts in the South were about 111,000 cords higher during May than during April, and were 26 per cent above those of May, 1943. These receipts directly reflect the release of wood cut in previous months, which has been unable to move to the mills earlier because of the abnormal rain of the first four months of this year."

The record in rough cords of receipts of domestically cut pulpwood by region (excluding imports) follows:

Region	*May,* 1944	*April* 1944
Appalachian	154,703	139,144
Northeast	106,370	95,205
Lake States	84,314	148,163
South	634,883	523,486
Pacific Northwest	236,207	225,475
Total U. S.	1,216,477	1,131,473

Imports in cords of pulpwood by U. S. mills were distributed as follows: Appalachian, 300; Northeast, 38,853; Lake, 17,907; Pacific Northwest, 10,641.

▶▶▶ THE RESIGNATION OF Willard L. Davis as assistant director of the Paperboard Division of the WPB was announced last month. Marc Shofer, formerly of the Iowa Fibrebox Company, Keokuk, Iowa, was appointed to succeed Mr. Davis. Mr. Shofer has been with the WPB since May 4.

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▶▶▶ THE REMOVAL OF VINSOL resin from allocation by the War Production Board, makes these materials now available to industry for all uses, according to a recent announcement by the Hercules Powder Company. Prior to being placed on allocation, October, 1943, Vinsol resin was used in the manufacture of paperboard, and plastics. During the period of allocation, Vinsol resin was used in plastics and paperboard to replace the use of strategic metals.

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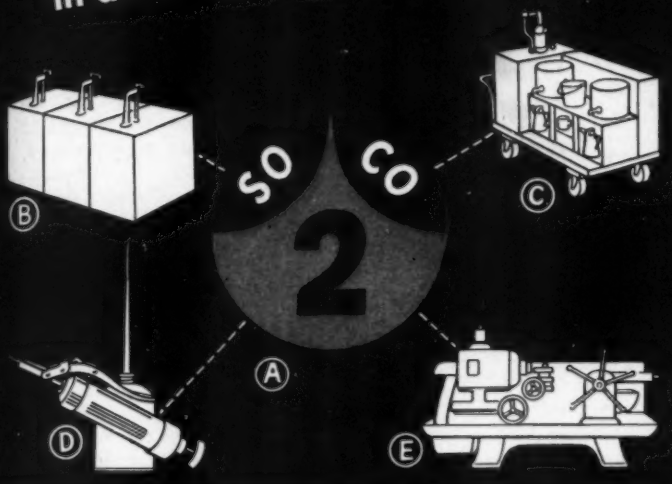
▶▶▶ MAXIMUM PRICES for contract logging services performed in the western half of the United States were frozen June 20 by the OPA at the price paid by the buyer on January 11, 1944, the effective day of the regulation covering such services. The freeze order became effective June 24.

◆

PUBLISHERS ASK WPB TO FORBID 30-LB. NEWSPRINT

American newspaper publishers have completely reversed their position on the use of lightweight newsprint, and a committee has formally asked the War Production Board to issue orders forbidding the manufacture of newsprint at a 30-pound basis weight, returning to the old standard of 32 pounds. The publishers hoped to secure a larger surface of newsprint by the use of lightweight paper, and secured an amendment to the Tariff Act permitting the duty free importation of paper of 30 pound basis with a tolerance of 5 per cent, or a net of 28½ pounds. Canadian manufacturers, however, felt that the production of this weight was uneconomical and would not result in the conservation of sulphite. Even though the OPA authorized a higher price for the lightweight paper to compensate for the added cost of manufacture, the Canadian mills were still opposed to the use of this basis weight. Canadian authorities, who had guaranteed the delivery of 200,000 tons per month of 32-pound paper, reduced the tonnage, with the result that domestic users were paying $5 per ton additional for their paper, with no additional yardage.

How to get the right lubricants in all of the right places



A. A code number is assigned to each lubricant used in the plant and a bright numbered decal like that above is applied to every container and lubrication point.

B. Each storage container has one of these numbered decals on it to indicate the lubricant it holds.

C. Every container on the lubrication cart is marked with a numbered decal.

D. Every oil can or grease gun is identified by a decal and filled from the cart or storage container with that numbered lubricant.

E. Every spot to be lubricated on each machine is marked with the code number of the lubricant required.

Standard Coded Lubrication Service

... helps your oilers put lubricants where they belong

YOU HAVE spent much time and effort determining just which grease or oil is the best for each type of service in your plant. Haven't you wondered at times whether the thousand and one spots to be lubricated *always* get the *right* lubricant?

We have developed a simple method that will relieve you of that worry. It's Standard *Coded* Lubrication Service. The diagram above briefly explains how the system works.

The only record you need to keep is a lubrication chart listing the lubricants used in your plant and the code numbers assigned to them. These numbers have no significance outside of your plant. You order lubricants by brand name just as you do now, *but apply them by number.*

Standard Coded Lubrication Service offers these advantages:

Prevents breakdowns resulting from the application of the wrong lubricant.

Simplifies training and instructing new oiler crews.

Saves oiler time by eliminating the need for looking up lubrication recommendations for individual machines.

Fits any lubrication program.

Simplifies lubrication requirements.

Avoids confusion of brand names.

Any of the advantages above is ample reason for calling your Standard Oil Industrial Representative for further information. Discuss it with the men in charge of your lubrication. For the Industrial Representative nearest you, or further information, call your local Standard Oil Company (Indiana) office, or write 910 South Michigan Avenue, Chicago 80, Illinois. In Nebraska, write Standard Oil Company of Nebraska at Omaha 2.

Gasoline Powers the Attack . . .
Don't Waste a Drop!

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ LUBRICATION ENGINEERING

LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICAT

PAC. PAPERBOARD INCREASES CAPACITY—JOHN HINTS ON STAFF

By starting operation of its rebuilt 300-ft. machine, purchased nearly two years ago, the Pacific Paperboard Company, Longview, Washington, has increased its daily capacity of paperboard from 85 tons to 150 tons.

John Hints, of White Pigeon, Michigan, is joining the staff to take charge of the conversion plant which is being enlarged.

◆

BROWN CORPORATION HAS A PROGRAM FOR PLANT DEVELOPMENT

A program of plant developments and alterations involving some $850,000 is being carried on from time to time by the Brown Corporation, of La Tuque, Quebec. Different phases of this work are undertaken as conditions permit.

At the present time, the machine room is undergoing modernization. Shipping facilities are being improved and a site cleared to replace several smaller machines with a larger one. If war conditions permit, the major job of installing equipment is scheduled for 1945. The plant capacity will not be affected, the principal purpose of the work being to dry the pulp more thoroughly and thereby save excess freight costs.

◆

FINANCIAL

An invasion boom in the stock market was reflected in paper mill securities, the advance in prices beginning with the successful invasion of French territory early in June. Practically every paper mill security listed on the New York exchanges showed some advance in value at the end of the month as compared with May prices.

Albemarle Paper Manufacturing Company—Net income for the first quarter was $134,787 as against a net loss of $114,558 in the same quarter of 1943.

Certain-Teed Products Corporation—Net profit for the March quarter was $434,351 as compared with $201,802 for the same quarter in 1943.

Continental-Diamond Fibre Company—Net profit for the March quarter was $83,878, as compared with $133,669 a year ago.

International Paper Company—Net profit for the first quarter was $2,116,706 as compared with $2,023,118 for the same quarter in 1943.

Masonite Corporation—Net profit for the quarter ending May 31 was $304,918, and for the nine months ending the same date, $814,637 as compared respectively with $244,320 and $847,749 for the comparable periods in the previous fiscal year.

National Container Corporation—Net income for the March quarter was $258,787, as compared with $175,140 for the same quarter a year ago.

Simplex Paper Corporation—Net income for 1943 was $210,677 as against $130,000 in 1942.

Weyerhaeuser Timber Company—Net profit for 1943 was $8,360,797 as against $8,606,173 for the previous year.

West Virginia Pulp and Paper Company—Net profit for six months to April 30 was $1,210,634 as against $1,555,308 for the same period in the previous fiscal year.

United Paperboard Company—Net profit for nine months to February 26 was $53,852.

New York Stock Exchange—Stocks

	Closing Prices June 24	May 25
A. P. W. Paper Co...	4¼	3
Celotex	14⅞	11¾
Same Preferred	18¼	17¾
Certain-teed Products..	7⅛	6
Same Preferred	76⅜	63½
Champion P. & F. Co.	26½	25½
Same Preferred	112½*	110½–112
Container Corp.	25¼	24¼
Cont. Diamond	11⅞	10¼
Crown Zellerbach	18⅝	17⅛
Same Preferred	100	99½
Dixie Vortex	17	*16–16¼
Same "A"	46¼	45½
Robert Gair	4¾	3⅞
Same Preferred	14¾	14¼
Gaylord Container	17⅜	17½
Same Preferred	53½	*54–55½
International Paper	18⅛	16
Same Preferred	83⅜	80¼
Kimberly-Clark	*37–39	34½–36½
McAndrews & Forbes	28⅛	*26–26¼
Masonite	47¼	49¾
Mead Corp.	11¾	9⅛
Same Preferred	93	*89–92
National Container	17	15⅜
Paraffine Cos	56⅛	51
Same Preferred	105¼	105¼
Rayonier	16½	14⅝
Same Preferred	32–	30½
Scott Paper	41½	*40⅛–41
Same 4½% Pref.	110¼	*110¼–111½
Same 4% Pref.	110	109½–110
Sutherland Paper	33	*30½–31¼
Union Bag & Paper	12⅛	10⅞
U. S. Gypsum	86	73½
Same Pref.	174	*173½–175

New York Stock Exchange—Bonds

Abitibi 5%	79¼	76¼
Celotex 3¾%	103¼	.....
Certain-teed 5½%	102	101
Champion P. & F. Co. 4½%	.....	.....
Inter. Paper 5%	104	103¾
Same 6%	108	107½

New York Curb Exchange—Stocks

Am. Boxboard	.....	.....
Great Northern	34⅜	33
Hummel Ross	6	5¼
St. Regis	5½	4¾
Taggart	6	5⅜
United Wall Paper	2⅞	2¾

*Closing Bid and Asked Prices.

MARATHON PAPER MILLS ADOPTS COMPREHENSIVE FINANCIAL PROGRAM

At a special meeting of stockholders held at the company's offices in Rothschild, Wisconsin, July 6, the articles of incorporation were amended, and a finance program adopted.

The financing provides for authorization to borrow not exceeding $10,000,000 at a rate of interest not to exceed 3¾ per cent per annum to be evidenced by the company's debentures maturing not later than December 31, 1960, and the authorization of 50,000 shares of cumulative preferred stock of a par value of $100 per share with a dividend rate not to exceed 5 per cent per annum.

The company has named the Lee Higginson corporation of Chicago as the principal underwriter for the preferred stock, the proceeds of which, together with the sale of debentures to be placed privately, will provide funds for the erection of a bleached sulphate pulp mill, together with the necessary dock and housing facilities at Peninsula, province of Ontario, Can. (to be known as Everest); the improvement and expansion of conversion facilities in the United States, and the retirement of the company's present $2,762,000 mortgage debt and redemption at par on July 1, 1944, of 11,987 outstanding shares of 6 per cent preferred stock.

The balance of the proceeds will be used to augment working capital and enable the company to meet additional requirements of an increasing volume of business.

In connection with the program, the company proposes to issue two shares of common stock of the par value of $12.50 per share in exchange for each share of the present common of the par value of $25. This would result in the issue of 400,000 shares of common in place of the present 200,000 shares. It is believed that advantages will accrue to the company and its stockholders through the more widespread distribution of its common stock and that the proposed split-up will facilitate such a result.

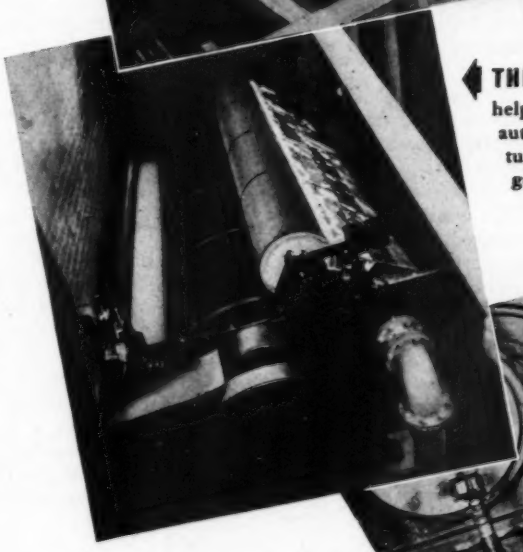
Because of the fundamental changes which have taken place in recent years in the character of the company's business through the addition of new and expanding production lines for "food packaging" and the development of the chemical division, it is felt that the present corporate name is no longer descriptive of the essential nature of the business now being conducted by the company. A change in the name to "Marathon Corporation" has been approved by the board of directors.

BIRD MACHINERY

For Points Of Critical Importance In The Papermaking Process

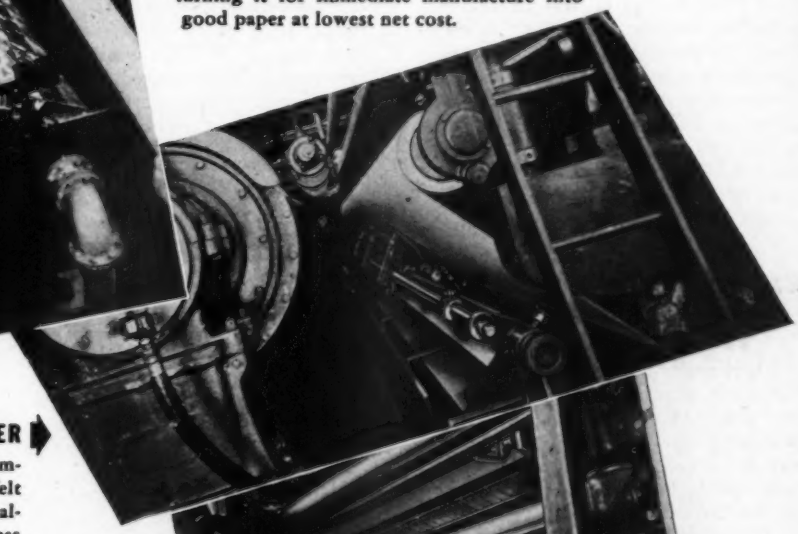
THE BIRD SCREEN

helps to maintain maximum production of uniformly good paper, despite increased dirt in the stock. It is essential for individualizing the fibres and delivering them to the paper machine free of lumps, strings and slime.



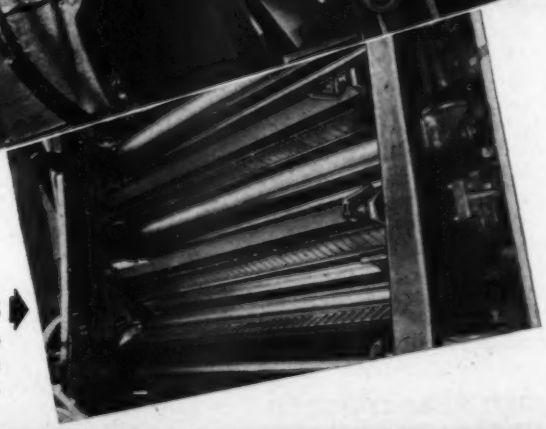
THE BIRD SAVE-ALL

helps to conserve good stock, recovering it automatically from the waste water and returning it for immediate manufacture into good paper at lowest net cost.



THE VICKERY FELT CONDITIONER

keeps the paper machine on the job, eliminating mid-week shutdowns for felt wash-ups. It helps maintain paper quality and cuts drying cost by keeping press felts continuously clean and open.



VICKERY DOCTORS

keep every papermaking roll in shape to do its best work continuously and with less attention and maintenance expense.

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

ADDITIONS TO LAKE ST. JOHN P. & P. CO. PLANT AT DOLBEAU

Additions are being made to the plant of Lake St. John Power & Paper Company, Dolbeau, Quebec, which it is estimated will cost $235,000. An extension of steel and tile construction will house a Flakt dryer, which will handle about 100 tons per day of 60 per cent air-dry sulphite pulp, drying it to 100 per cent air-dry pulp.

The new development will make possible an increased plant capacity of about 5,000 tons per annum of sulphite pulp, but there will be no increase in the number of employees. It is expected the Flakt dryer will be in operation before September 1.

◆

DILL & COLLINS IS NOW A DIVISION OF MEAD CORPORATION

Since 1932, Dill & Collins, Inc., Philadelphia, has been operated as a subsidiary company of The Mead Corporation, Chillicothe, Ohio.

An announcement dated June 10 states that effective on that date, Dill & Collins became a division of The Mead Corporation. This action has been taken to further simplify the capital structure and to best serve the interests of the many customers. The sale of Dill & Collins papers will continue under the direction of The Mead Sales Company, through its wholly owned subsidiary, Dill & Collins, Inc.

◆

EXPERIMENTS IN WORK TO MAKE WOOD PULP FROM LOGGING WASTE

Experiments at Ladysmith, British Columbia, to prove that logging waste and debris may be manufactured into woodpulp are proceeding satisfactorily, but it is too early to have reached any conclusions, according to officials of the Government's forest branch.

The experiment has been proceeding for nearly a year, but the job is a gigantic one and subject, in the winter months, to weather conditions. If successful, stumps and bits of wood left after logging operations, which in the past have been fire hazards, will be manufactured into woodpulp.

◆

INVALIDED PARATROOPER FIRST FORESTRY STUDENT

The New York State College of Forestry, Syracuse, has set up special courses in connection with the educational program of the U. S. Veterans Administration, which covers both professional and vocational training.

The first student to be registered for this special course is William D. Hubbard, a paratrooper, invalided home from Algiers. Mr. Hubbard, whose home is in New York City, states that he chose forestry after making a survey of the educational opportunities offered discharged veterans. He completed practically two years of study at Harvard before entering the Army.

◆

KIMBERLY-CLARK CORP. WINS ARMY-NAVY "E"

An outstanding record of production in the manufacture of mounts for M-45 anti-aircraft guns, won for the Kimberly-Clark Corporation, Neenah, Wisconsin, the Army-Navy "E" pennant.

The ceremonies were held June 20 at the plant with a gathering of 1,500 employees and friends. The presentation address was by Brig. Gen. Albert J. Browning, representative of the Undersecretary of War. Cola G. Parker, president of the corporation, accepted the award. Seven employees were chosen for a ceremony when Private Robert Kindy, who participated in the invasion of North Africa and Tunisia, pinned "E" pins upon them. Similar pins were distributed to all of the employees. Music was furnished by the Lawrence College Navy Band.

Briefs . . .

▶▶▶ GERMAN WAR PRISONERS are housed at Stark, New Hampshire, while engaged in cutting pulpwood for the Brown Company, Berlin, New Hampshire. The camp is in charge of Major Edgard C. Schwartz, USA, who states that the inexperienced men are putting up about a cord a day for each three-man crew. As they become more experienced, they are able to produce a cord per man each day.

◆

▶▶▶ THE WASTEPAPER ALLOCATION Order is viewed with concern by Holyoke (Mass.) paper manufacturers who have developed an effective collection system. The three Holyoke mills that use wastepaper are: the Newton Paper Company, the Chemical Paper Manufacturing Company, and the Gill Division of American Writing Paper Corporation. In April, these mills collectively consumed 2,365 tons of wastepaper. During that month, they were able to buy 2,422 tons through their increasing organization of supply channels largely in Western New England.

◆

▶▶▶ IT HAS BEEN OFFICIALLY stated that the St. Regis Paper Company, New York City, has concluded a contract with the War Department to establish a prisoner of war camp at Harrisville (Lewis County), New York. This camp will care for one hundred sixty German prisoners who will cut pulpwood for the St. Regis company. The prisoners will undergo several weeks of training by experienced foresters before they will be set to cutting pulpwood.

◆

▶▶▶ A DONATION OF $1,000 has been given to McGill University, Montreal, by the Brown Corporation to provide a Fellowship in the department of industrial and cellulose chemistry. This department is headed by Dr. C. B. Purves.

◆

▶▶▶ THE INSTALLATION OF two additional barking drums is contemplated by St. Raymond Paper, Ltd., Montreal, for the mill at Desbiens, Quebec.

◆

▶▶▶ THE SALE OF ITS Canadian timber subsidiaries to Canadian interests has been announced by the Puget Sound Pulp and Timber Company, Bellingham, Washington. The consideration was announced as $5,000,000 plus interest on deferred payments. The company has a 35-year option covering all exportable pulp timber produced on crown grant lands included in the properties being sold.

◆

▶▶▶ THE SHORTAGE OF CONTAINERS for the shipment of military supplies is having a serious effect on the paper industry, with the result that the use of pulp for container board is being favored as against its use for less essential papers. A campaign has been initiated to relieve the situation by the extensive re-use of corrugated cartons. The demand of the military service for waterproof paper is having its reaction on the kraft paper market, with the result that the shortage of wrapping paper for civilian users is beginning to be experienced even by the housewife.

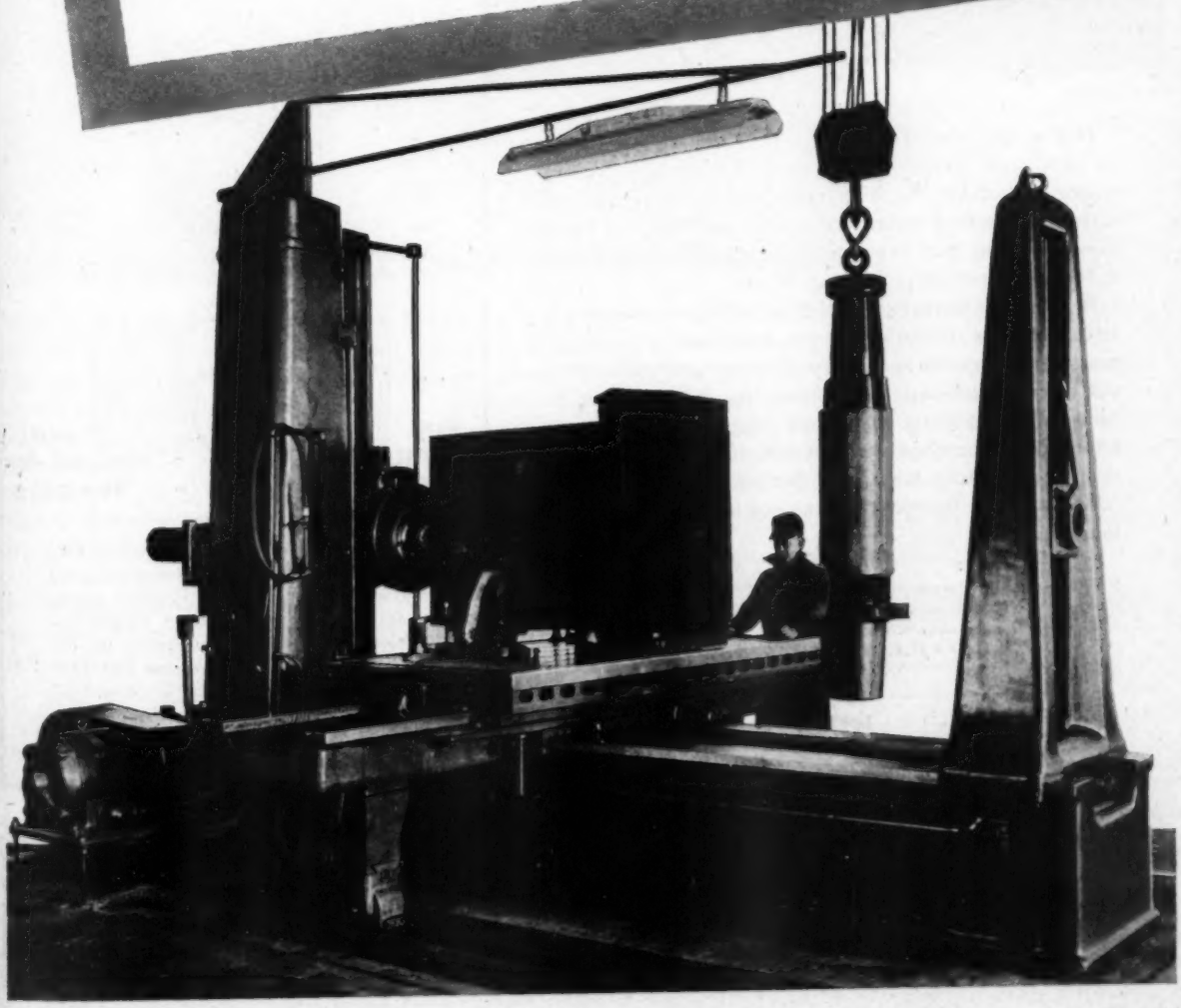
◆

▶▶▶ REMOVAL OF offices of the Graham Paper Company, St. Louis, Missouri, has been announced. The new location is 475 Fifth Avenue, New York 17, New York; telephone number, Murray Hill 5-7130.

WAR materials roll faster from our shops because of many new, modern machine tools. Assembly lines are helping to speed-up output. The accelerated war production program called upon us to do more and more and more. Plant expansion and additional machines were required. While installed primarily to increase the supply of equipment for our fighting forces, most of the changes we have made fit into our normal, peacetime operating needs. Today's production for Victory speaks well for tomorrow's production for peace. We hope that our employees now on the battle fronts will soon be back. We hope that before very long these machines will not be used to build for war but can serve the nation by making paper mill machinery needed to supply a world at peace with the wide variety of paper products necessary to better living.

THE APPLETON MACHINE COMPANY

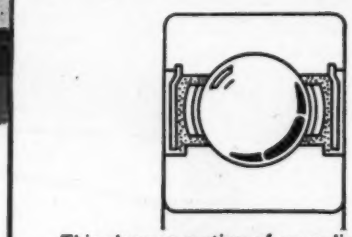
APPLETON • WISCONSIN



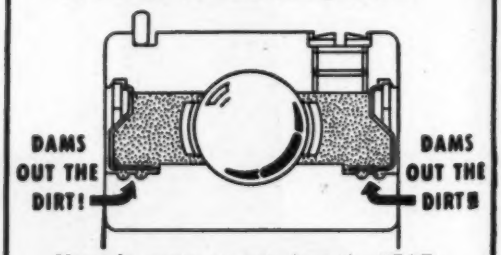
Dirt is the curse of every user of motors and machines. In shop and factory it gets into the average bearing, where it destroys the high finish, abrades the polished surfaces, creates friction that results in vibration, looseness and noise. And its action is cumulative—once started, it leads to premature bearing failure.

In the NORMA-HOFFMANN "CARTRIDGE" BALL BEARING, wearless metal seals combine with "labyrinth" grease grooves to form a highly effective barrier that dams out dirt—at the same time preventing the escape of the lubricant packed in the extra large grease reservoir afforded by the double-row width of the bearing. As a result, the initial high anti-friction efficiency of the "CARTRIDGE" BEARING is maintained over extremely long periods.

NOTE:—Many representative motor, machine and tool builders are incorporating the "CARTRIDGE" BEARING in their products. When you buy such units, ask for the NORMA-HOFFMANN "CARTRIDGE" BALL BEARING.



This shows a section of an ordinary single-row "shielded" ball bearing, with its space restrictions limiting the grease capacity and the effectiveness of the sealing devices.

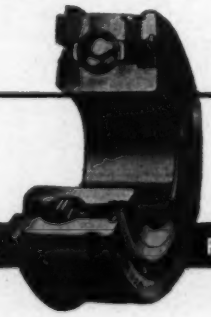


Here, in contrast, note how the "CARTRIDGE" BEARING double-row width not only affords at least 100% larger grease capacity than the ordinary single-row "shielded" bearing, but also permits the use of a highly effective and wearless seal.

NORMA-HOFFMANN

"CARTRIDGE"

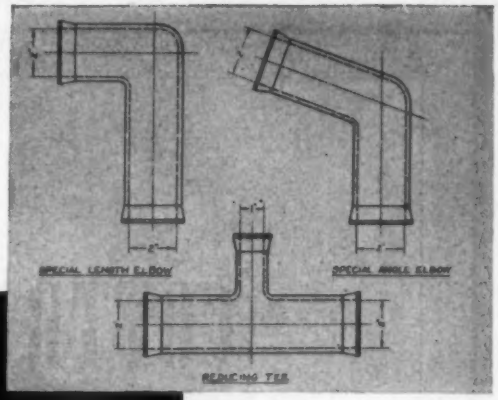
BALL BEARING



NORMA-HOFFMANN BEARINGS CORPORATION, STAMFORD, CONN. FOUNDED 1911

TO WIN THE WAR: WORK—FIGHT—BUY WAR SAVINGS BONDS!

SPECIAL GLASS FITTINGS to your order



Illustrated above are three of the most common special fittings regularly supplied. Besides these—sweep elbows, crosses, reducing ells, manifolds, etc., can be furnished. Prices quoted on request. Merely send sketch.

•

Pyrex brand Glass U-Bend with 90° elbow outlet is just one of the special fittings Corning has been called upon to furnish.

When laying out a PYREX Glass Pipe Line you don't have to keep one eye on your drawing board and the other on a pipe and fitting catalog to make sure you can get the special fitting you need. You just lay out your line exactly the way you want it, specify the special fittings you need and then call on Corning to make those fittings out of PYREX brand Glass. And you don't have to pay an excessive premium for them. They cost but little more than standard glass fittings.

It's easy to order special PYREX pipe fittings too. All we need is a rough sketch showing leg lengths, pipe diameters, and angles, and we'll be able to convert your sketch into the fittings you need.

Why temporize and experiment with combinations of piping materials, when you can get just the piping layout you want and have the advantages of acid resistance, resistance to abrasion, to mechanical and thermal shock, in addition to the transparency throughout a long life that only PYREX Piping can give you. Adaptor connections are also available for connecting PYREX Piping to any pipe line, valve, pump or tank.

Corning engineers will be glad to have you consult with them on your piping problems. Send in coupon or write to the Industrial Division.

Corning Glass Works, *Industrial Div.*, Dept. PI6
Corning, New York.

I would like glass piping information immediately on the subjects I have checked below. I understand there is no obligation.

☐ Installation Manual ☐ Valves
☐ PYREX Piping and Heat Exchangers ☐ Adaptors

Name_____

Firm_____

Street_____ City and State_____

"PYREX" is a registered trade-mark and indicates manufacture by Corning Glass Works, Corning, N. Y.

CORNING
Glass Works
Corning, New York

Pyrex Industrial Glass

COTTRELL PROCESS

of

ELECTRICAL PRECIPITATION

universally recognized as a
standard method of removing

DUST, FLY ASH, FUME, MIST & FOG

***from* GASES**

•

30 years of research, development and operating experience
throughout the world are incorporated in the

COTTRELL INSTALLATIONS

offered to meet the requirements
of any problem by

RESEARCH CORPORATION

405 LEXINGTON AVENUE
NEW YORK CITY

59 EAST VAN BUREN STREET
CHICAGO, ILL.

MILLIONS OF GALLONS FOR INVASION

After being processed in tall towers and speeding over the nation's railroads by tank cars, millions of gallons of fighting fuel are waiting in huge storage tanks made by General American. Military and industrial experts in every quarter of the globe know that the GATX triangle symbolizes maximum quality . . . it can mean substantial production economies for *you*, in peace as in war.

GENERAL AMERICAN TRANSPORTATION CORPORATION

GATX GENERAL AMERICAN
PLATE & WELDING DIVISION
PLANT AT SHARON, PA.

Plate & Welding Division — **Sharon, Pennsylvania**

Specialists in plate fabrication — manufacturers of pressure vessels of steel, alloys and aluminum—all classes of welding — process equipment of all types—chemical engineering laboratories and service—completely equipped field erection department.

This
is the STEEL VALVE that has –

. . . eye-bolt construction for the packing flange, in all types *including Globes* . . . Gates . . . Angles . . . and in all pressures *including the 150-pound class.*

. . . full-threaded bonnet stud bolts in all pressures *including the 150-pound class,* to achieve equal expansion and contraction.

OIC Cast Steel Valves . . . Gates . . . Globes . . . Angles . . . Checks . . . are available in the 150 and 300-pound pressure classes, with screwed, flanged or butt welding joints.

ARMY E NAVY
OIC

There is an OIC Distributor near you who is ready to demonstrate to you the many superior features of OIC Cast Steel Valves. Call him or write to us for full details.

THE OHIO INJECTOR COMPANY
WADSWORTH, OHIO

Quality Leaders in Valve Manufacture Since 1883

IT TAKES A *Long Time* TO DESIGN A "Buffalo" PUMP

★Sometimes we think it takes too long. But then we're reminded that when the engineering department finally says "go ahead and sell 'em," we seldom have any difficulty in "keeping 'em sold."

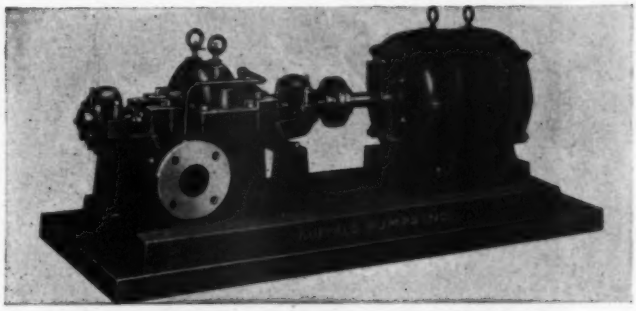
Pumps in the test room are no different than pumps on the job. If you make your testing severe enough—you can detect all their faults and weaknesses BEFORE you offer them to your customers. And if you redesign to remove those weaknesses, it takes time. When the job is finished, though, and providing your basic design is right, you'll have a pump that PERFORMS on the job like those shown here! And as has been our experience, users will come back for more!

If you haven't used Buffalo Pumps, we suggest that you plan to try one.

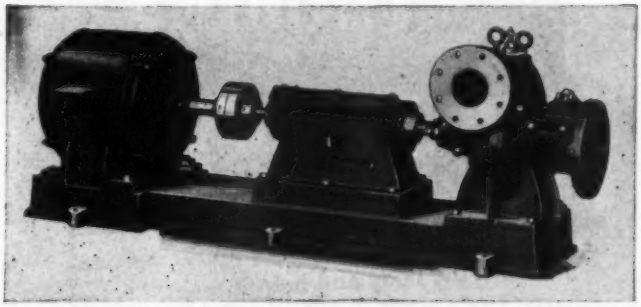
BUFFALO PUMPS INC.

213 Mortimer St. Buffalo, N. Y.

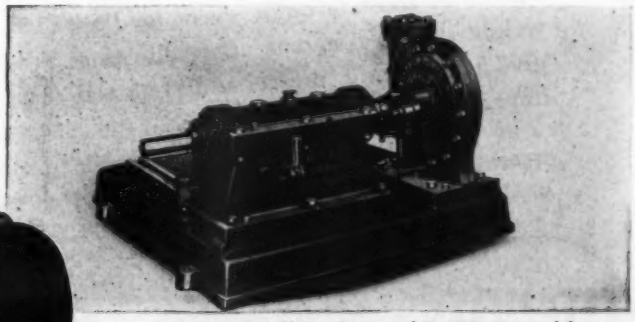
Canada Pumps, Ltd., Kitchener, Ont.



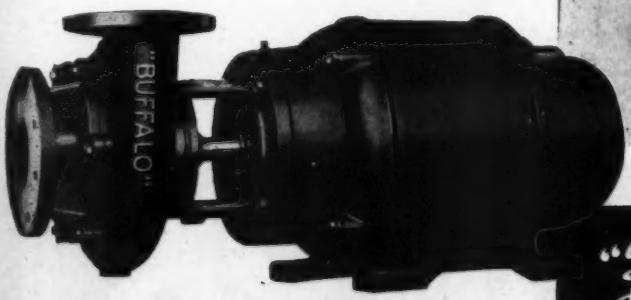
Buffalo 2-stage Double Suction "RR" Boiler Feed Pump



Full Ball Bearing Diagonally Split Shell Paper Stock Pump



Buffalo Full Ball Bearing Lead Pump arranged for Texrope Drive



Buffalo Close Coupled Single Suction Pump

"Buffalo" CENTRIFUGAL PUMPS

Are Your Fine Papers Getting the Right "VITAMINS"?

TITANOX pigments are to fine paper stocks what vitamins are to the human system. As vitamins make up for deficiencies in the body and help it resist disease, so TITANOX pigments build opacity, whiteness and brightness into paper and minimize show-through even in light weight stocks, eliminate after-yellowing, give fine printing surfaces and in no way impair the strength of the paper.

Only titanium pigments, of which TITANOX is the oldest and most widely used, can give all these benefits. In addition, because TITANOX pigments are on the blue-white side they give extra visual brightness within permissible limits.

TITANOX pigments are giving outstanding help in the building of satisfactory wartime papers. They are worth investigating.

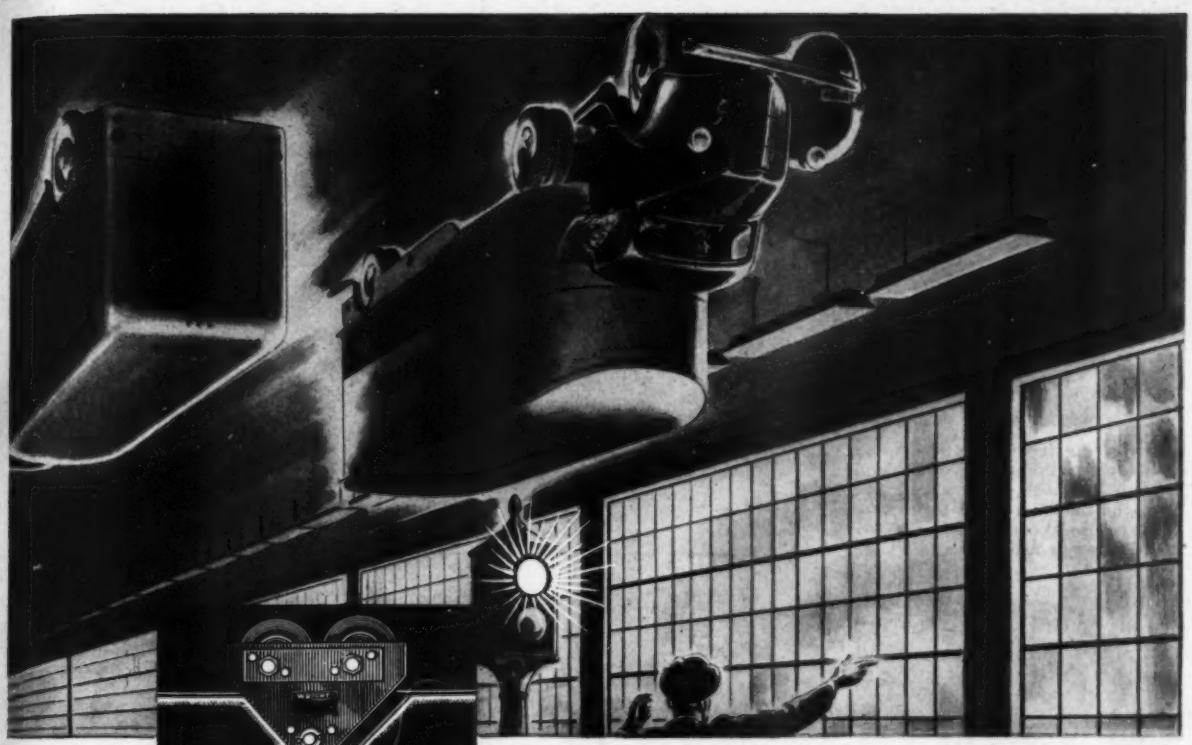
TITANIUM PIGMENT CORPORATION, *Sole Sales Agent,* 111 Broadway, New York 6, N. Y. • 104 South Michigan Avenue, Chicago 3, Illinois • 350 Townsend Street, San Francisco 7, California • 2472 Enterprise Street, Los Angeles 21, California

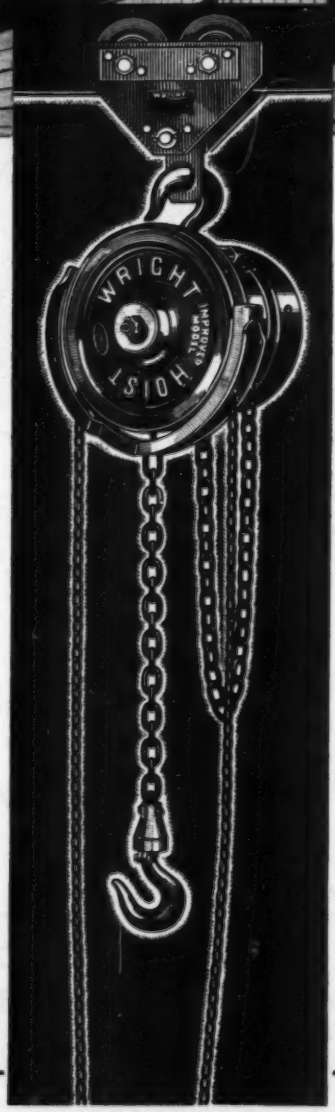
TITANOX

REG. U.S. PAT. OFF.

TITANOX

TRADE MARK





WRIGHT MAKES HIGHWAYS OF THE SKYWAYS OF YOUR PLANT

WRIGHT engineers (and **WRIGHT** Hoists and Cranes) convert idle ceilings into production boulevards. **WRIGHT** Improved High Speed Hoists, **WRIGHT** *Speedway* Electric Hoists, and **WRIGHT** Cranes have long made possible fast, safe, economical, horizontal and vertical transportation of materials.

Your local **WRIGHT** distributor is well qualified to suggest methods for both speeding production and saving money. You will find him listed in your metropolitan classified telephone directory. If your problem is special, ask your distributor to call a **WRIGHT** engineer, who has had years of experience in solving material handling problems.

WRIGHT MANUFACTURING DIVISION

York, Pa., Chicago, Denver, Los Angeles, San Francisco, Portland, New York

AMERICAN CHAIN & CABLE COMPANY, INC.

BRIDGEPORT · CONNECTICUT

ACCO

In Business for Your Safety

We asked 5 foolish women why they don't check ceiling prices

"The storekeeper might get mad"

You're wrong there, lady. Good merchants appreciate customers who keep an eye on ceiling prices, who don't ask them to buy on the black market, who never ask for rationed goods without points, who share and play square with scarce goods.

..."It's too much trouble"

It isn't a lot of trouble to do the little the Government asks—just remember to ask every time you make a purchase, "Is this the ceiling price?" And it's well worth the trouble—if it holds prices down, lessens the danger of inflation.

"We can afford to pay more"

Maybe *you* can, but how about the millions of soldiers' families who must live on Army allotments? Every time you pay black market prices or buy rationed goods without points, you're helping to send prices up—that's the way inflation comes. And *nobody* can afford inflation.

"My store doesn't display ceiling prices"

All retailers will if you keep asking them, "Is this the ceiling price?" It's the law. Ceiling prices must be displayed wherever goods under ceilings are sold. That's the system which has helped to keep prices so much lower in this war than they were in the last.

"I just don't want to do it"

No—and our boys don't want to fight! But they're doing it—magnificently! It's up to you on the home front to do your part to head off rising prices and inflation, help prevent producing a depression for our boys to come home to. Don't be a SABOTEUR on the home front!

Check and be proud! You should be proud if you're the kind of loyal, patriotic American citizen who never pays more than ceiling prices, who pays her ration points in full, who shares and plays square with scarce goods!

It is because of you and millions of women like you—cooperating with American merchants—that the cost of living has gone up only 7 per cent since your Government's price control started.

But the end is not yet. So keep up the good work. Ask *every time*—"Is this the ceiling price?" Never buy a single thing that you can do without. Save your money—in the bank, in life insurance, in War Bonds. When you use things up, wear 'em out, make 'em do, or do without . . . you're helping to HOLD DOWN PRICES!

YOUR STORE WILL BE GLAD TO HAVE YOU ASK:

"Is this the ceiling price?"

A United States War Message prepared by the War Advertising Council; approved by the Office of War Information; and contributed by this magazine in cooperation with the Magazine Publishers of America.

TYPE OG
LOUIS ALLIS
OPEN "PROTECTED" MOTORS
Frame 225 Illustrated

Available Now — A Complete Line

Type OG Louis Allis motors have given a splended account of themselves in the war program for over two years—they are not a "new" line—They have been tried and proven in the most exacting and critical work of the present war effort.

These motors are now available in a complete line—in AC they are available from ½ to 500 HP and in DC from ¾ to 200 HP.

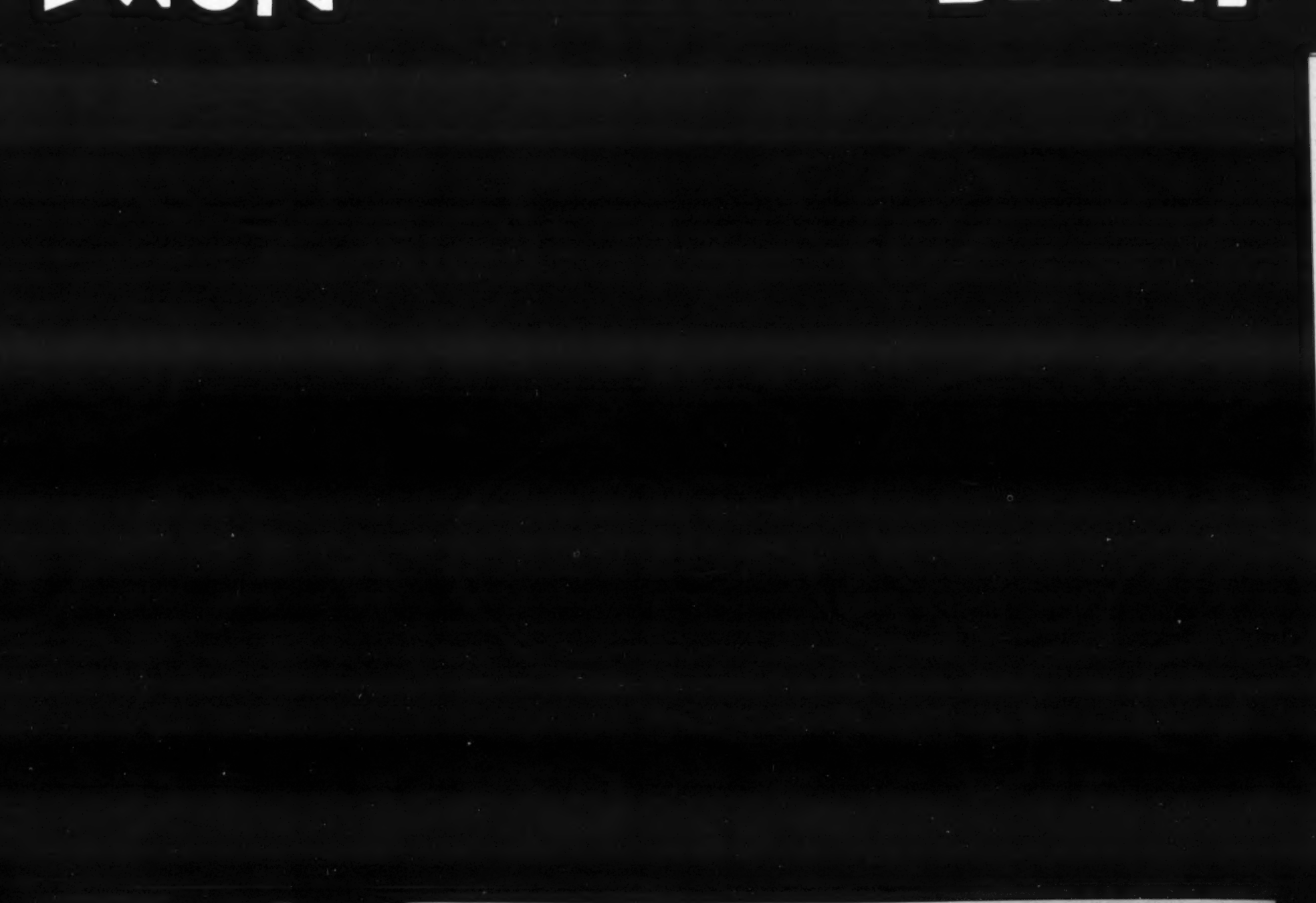
THE LOUIS ALLIS CO., MILWAUKEE 7, WIS.

Simple, Sturdy, Precision Construction Throughout.

Every part of the Louis Allis Type OG open "protected" motors are carefully engineered and precision built to assure long life of dependable service on the tough jobs.

Fourteen points of in-built quality construction are pointed out in the above disassembled view. Upon request a copy of new fully descriptive bulletin will be sent.

THE LOUIS ALLIS CO., MILWAUKEE 7, WIS.



VALVE *Performance*

CASH STANDARD *Streamlined* TYPE 1000 PRESSURE REDUCING VALVES

THAT PREVENTS CHANCE OF ANY CHANGES OCCURRING IN YOUR PROCESSING OR OF DAMAGE TO PRODUCT . . .

The streamlined structure of the "1000" Valve gives you straight line flow of steam, air, oil, etc. This highly modern design has made it possible to eliminate working parts that ordinarily are hindrances to dependable, long-time performance—the "1000" has only one vital moving part (the seat piston). In this streamlined flow is found the answer to dependable pressure control under varying loads. This feature alone is a preventative of changes occurring in the processing or of damage to the product.

Among other advantages of streamlining are ample capacity, tight closing characteristics, and a wide range of adjustment. These features combine to insure speedier production and smooth operation.

For complete details write for Bulletin "1000."

TURBULENCE LIKE THIS *Eliminated . . .*

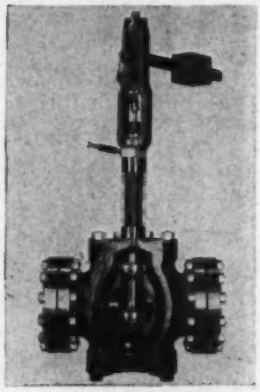
The streamlined form of the inner valve produces the flow pattern shown below. It is the reason users of the "1000" Valve get maximum capacity when it is needed most and accurate pressure control even when production hits non-stop proportions and operating conditions really are tough.

YOU GET THIS *Streamlined Flow*

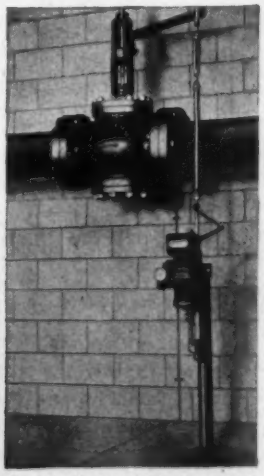
CASH STANDARD CONTROLS.. VALVES

A. W. CASH COMPANY
DECATUR, ILLINOIS

OTHER VALVES *from the* CASH STANDARD LINE



Cash Standard Balanced Valves, Series 42, have no lost motion. Have roller guides that kill side strains; stop packing trouble. Practically no maintenance. Sizes ½" to 12"; pressures up to 600 lbs. temperatures to 800° F. Bodies: iron, bronze, steel; all standard trims. With Air Cooled Packing Box (42-AC-R) shown above; or water cooled; or no cooling box. Made also with center guide. Bulletin 965.



The Cash Standard Type 100 Controller above is operating an 8" Type 42-R Balanced Valve, automatically reducing 250 lbs. down to 125 lbs. pressure, handling 200,000 lbs. steam per hour.

Type 100 Controllers have lots of operating power, enough for any size valve; are fully compensated; have adjustable range; are very sensitive. Bulletin 963 covering the Controller and Bulletin 965 covering the Valve give complete and interesting details. Write for them.

ARE YOUR FAN PUMPS YOUR BOTTLENECK?

Install the latest and best stock preparation equipment ahead of your machine—modernize your wet end and increase your dryer—do all those things but neglect your fan pumps and you've merely created a bottleneck.

When priorities permit, replace obsolete and inadequate fan pumps. Give the rest of your equipment a chance to "run at full capacity". Equally important, order now to get them reasonably soon after hostilities cease.

SHARTLE BROS. MACHINE CO.

MIDDLETOWN, OHIO

Dilts Machine Works, Fulton, New York.
Divisions of The Black-Clawson Co., Hamilton, Ohio.

Dilts

Centrifugal and plunger types for all stock and white water pumping. All types and capacities. Also agi-flo pumps for chest agitation.

. . . . . Editorial . . . . .

Do It Now

▸▸▸ "D-DAY" came as a surprise on June 6. The beachhead, which the Nazis boasted never could be made, was established firmly that day. Since then, to date, the whole of Breton peninsula has been taken. The drive for Paris is already on. The relentless march to Berlin is under way. The rout of the Axis outlaws will be in evidence by the time the ides of August roll around.

Every day now is "D-Day." The do-it-without-delay-day. Nothing can stop the cumulative, determined will of the Allies, particularly the Americans, to mop up every last armed outlaw in Europe.

Every day, everything that can contribute to the liquidation of the enemies of civilization, is forthcoming without delay. Every fighting front on the globe is being supplied with surplus equipment of every kind to back up our boys and their allies to insure victory at the earliest moment possible. In addition, we are in the midst of oversubscribing the hugest war bond drive on the home front.

We have a clear vision of the complete clean-up of the Axis in Europe and Asia in the near future. The spirit, which dominates America, is the "D-Day"-do-it-without-delay-today.

The time has come when we must begin to put into effect all those provisions for the regeneration and reconversion of all the processes for peace. America's all-out production for war was the outstanding factor that insured the victory on all fronts.

It will be the conversion of American war production to the processes of peace that will speed the rehabilitation of the world. Therefore, with any curtailment in the production of surplus war goods to insure victory, let us begin the reconversion of our facilities for insuring peace now.

Every day from now on should be the *do-it-without-delay day.*

Every day's delay in the production of commodities for finishing the war and hastening the peace, will be paid for in the sacrifices of the precious lives of our gallant fighters.

Do it today. Produce to the maximum today.

Buy bonds to your limit today. Insure peace now.

Victory is in sight.

* *

Making More Jobs

▸▸▸ PROBABLY THE MOST important individual problem facing the people of the United States in the postwar period is that of employment. What will industry and business and the government do to find jobs for all of our returning veterans and for workers who remain on jobs in war industries until no longer needed? These groups know that sooner or later their jobs will fold up but they will not jeopardize the war program by locating new work of permanent character before the war is won.

It is true that not all of these people will want jobs. Many women, for example, will be glad to leave the shops or other places of employment to the men, and will find happiness in returning to their homes or in the making of new homes. Other workers will be of retirement age.

Against this number, however, will be the millions who must and want to work, including all of the youth who will be looking for a first job.

It is the business of every industry or field of business to take stock now and to determine what it can do to aid in this labor adjustment program. The pulp and paper industry must not be amiss in this obligation.

If the pulp and paper mills are to do very much in this regard, something out of the ordinary must be done. Although one of the country's largest and most important industries, in the aggregate, the pulp and paper industry does not employ a large number of workers. In fact, within recent years, because of advanced engineering and technology the tendency has been toward more and more production per employee. Looking back to some figures, the combined production of pulp and paper in the United States in 1904 was a little over 5,000,000 tons; that of 1943, about 26,500,000 tons. The average number of employees in the industry in 1904 was slightly under 66,000; at present, it probably is somewhat less than 150,000. On this basis, production in 1943 was more than five times that of 1904, while the number of employees had only slightly more than doubled even though in the interim the industry had gone over from 2-shift operation to 3- and 4-shift operation.

With such figures as evidence, it doesn't seem that in the normal operation of pulp and paper mills there will be much opportunity to absorb war veterans and others in large numbers when peace time comes. There will be some openings, to be sure, but if the industry is to do its part in this postwar program of employment, it must do more than fill up the gaps in the existing employment ranks.

The point is that the ranks must be increased, more people must be put to work in the industry.

How can this be done? Not by having the industry remain status quo —not by having it increase paper production facilities somewhat. It can only be done by broadening the horizon of the industry. New ideas must be conceived; then they must be nurtured to fruition. Maybe papermaking fibers can be used in the fabrication of a variety of papers and paper products not even yet dreamed of by many of the outstanding thinkers of the industry. Maybe in some of the by-products of the industry are a wealth of products that need only a little more "know how" to develop.

No idea should be rejected by just the casual statement that it cannot be done. Rather the industry must consider every potentiality—possibly developing competition for fields never before considered competitive or even something completely new and noncompetitive to any existing product or products.

Leadership in the industry must know that ideas which may be only dross in the hands of one man may be diamonds in the hands of another.

Current Thought

WILLIAM SIBLEY

★

Goats Gotten

▶▶▶ ONE OF THE THINGS that gets my *goat* is this whole collection of prophecies about the termination of the War. For months, now, papers, radio receiving sets, magazines, and lecture platforms have been full of folks who predict that the War will end this or that date. Even though my neck is scarred (from having stuck it out too frequently)—this sort of thing gives me a pain in that portion of my anatomy which connects my head with my chest. Why? Well, in the first place, it is a subject about which no one knows the slightest thing. No one—not even among those who, as our President would say, are "in high places." All anyone (and that includes the military, political and financial leaders) can do is to guess.

And, for the luv-o-Pete, why ask with the right hand for a huge War Bond contribution, or a time-absorbing Red Cross Work Drive, when the left hand dishes out the information that the War is going to be over pretty soon?

As a sort of sideline, the writer does a little advertising. He writes copy, and since he is a copywriter the Treasury Department, the Red Cross, the USO, the This and That, come to him, either personally or by mail, to lend his time and talents toward writing copy or radio-commercials which will get people to buying War Bonds, or giving to the Red Cross, or contributing whatever they have to the USO. . . . All of which the writer (and scores of other writers I know) does with a sense of gratification and the realization that after all "the old men can help, too."

And then along comes a news dispatch from Churchill, Eisenhower, Smuts, Lloyd's of London, Dr. Stephen S. Wise, or Charlie Hot-Potato-In-His-Mouth, the eminent radio commentator, with the personalized prediction that the War will be finished *tout de suite*.

Yes, yes — the enemy is about to crack up, and everything will be hunky-dory in just a couple of shakes of the lamb's tail.

And in the face of that sort of information, the Treasury Department expects me, and a lot of other hard-working "mes" (who really have a living to earn, too) to put together phrases that will convince Mrs. Guggenslocker and Judge Winnerbottom that they should part with their hard-earned cash for some War Bonds. Says Mrs. Guggenslocker and the venerable Judge: "If So-and-so, who should know what he is talking about, says the War is going to be over soon — why should I buy your War Bonds? Nertz! I'll save my cash and buy one of those plastic-top automobiles I have seen pictured in the Art Institute magazine."

Just by way of showing you what the "experts" know about the duration of the War let me list a few of the prominent guesses. They are *almost* as good as my own.) As to knocking Germany out of the war: Lloyd's of London said February, 1944; Gen. Jan C. Smuts, 17 writers and radio experts, Gen. Eisenhower, Adm. King, Secretary Hull and Vice President Wallace *all* said 1944. Dr. Stephen S. Wise pinned his prophecy down to April 12, 1944. One hundred bankers throughout the United States said "October," 1944.

Okay — okay — okay. You and I and everyone else wishes that the first date had been right. We all hope for the early termination of the War. The sooner the end comes the less sweat, toil, and tears we have to shed. BUT — we still have to buy bonds; we still have to work for the Red Cross; we still have to help out the fellows and gals through the medium of the USO. So, for the love of Merciful Moses, why indoctrinate the payers with the belief that they will soon have the payees back home? It just doesn't add up, to my notion.

Sure, there may be a propaganda reason for all of these early dates — for, let us say, the German people. But who the dickens buys War Bonds? If you don't know, ask either the writer (who has tried to sell 'em over the radio and through space advertising) or Mrs. Sibley (who has collected dimes and quarters from movie audiences . . . and made bandages until her left shoulder gave out to the point where now she can do only sewing).

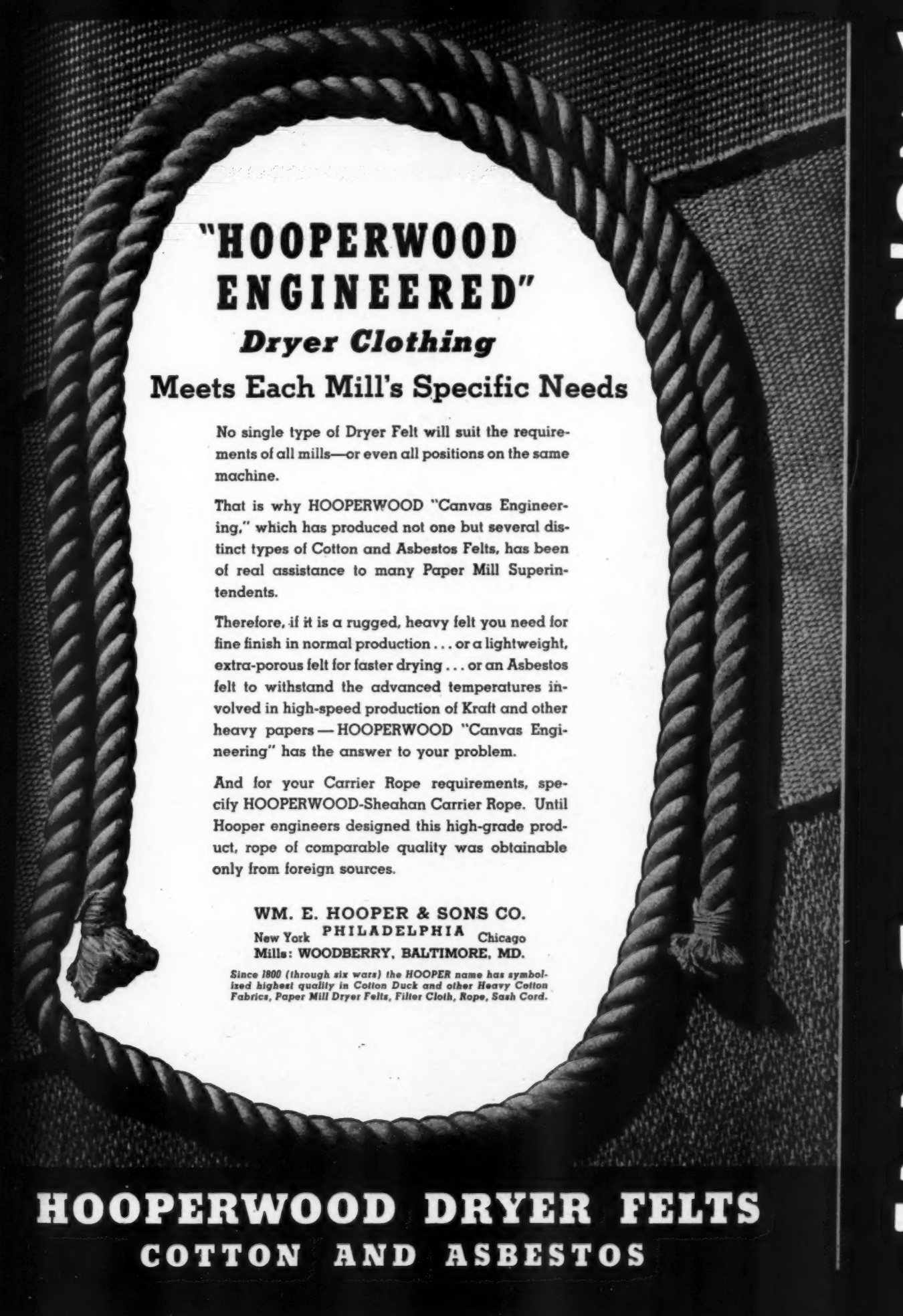
And now along comes *The United States News* dated June 30 with a two-page spread editorial, signed by David Lawrence, under the title of "The End of the War Is in Sight." This editorial gives Germany 90 days to last—Japan 18 to 20 months. Okay, experts. The dickens with trying to sell War Bonds!

Another thing that gets my goat is all the talk about *free enterprise*. Please tell me, gentle reader, when was enterprise *free?* Look—the Sherman Act, enacted back in 1890, was aimed at free enterprise. And it still is "marching on." The Clayton Act which restricted interlocking directorates, price fixing, etc., became a law in 1914. One of the most abusive and restrictive laws in human history, the Pure Food and Drug Act, was put in force during 1906. One of the strongest federal instruments of coercion is the Trade Commission, and that law was enacted approximately thirty years ago.

Please note these facts: With each passing year, enterprise is less free. With each passing election, the former radicals become the conservatives. That with each generation the curve toward collectivism grows ever downward. But, with each century, the life on this (and other) planets grows less arduous.

I have lived long enough (through Bois Penrose and to F. D. R.) to learn that political promises are dew on the grass. They evaporate quickly under the sun of Experience. But Experience has a way of not only making the dew on the grass generate life to the roots of ideas, but of developing leaves, which leave the *too* radical out on a withered limb. I am long past the meridian, but I doubt if I shall live so long as to sell America short.

VIOLATION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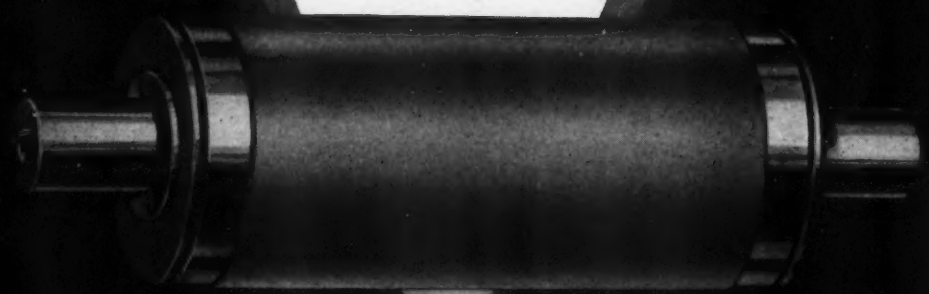

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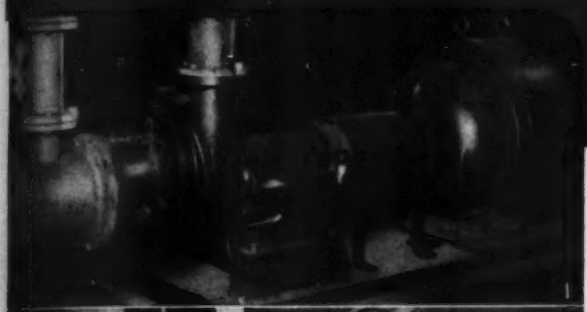
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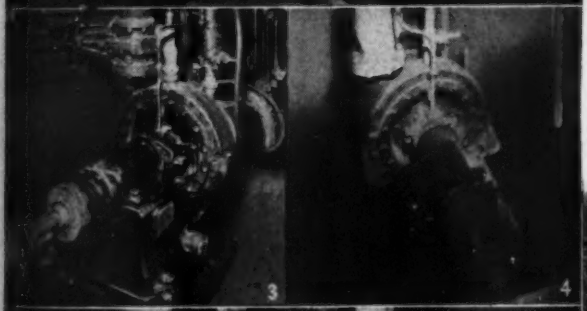
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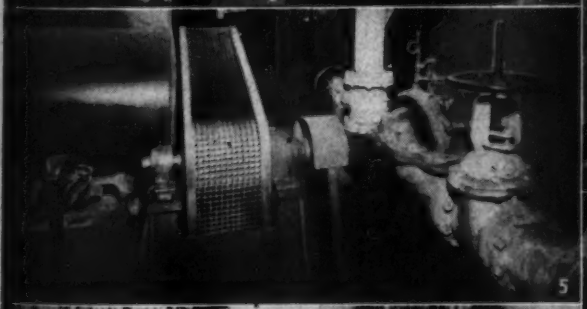
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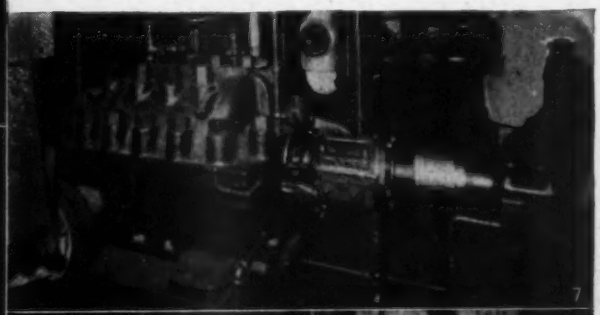
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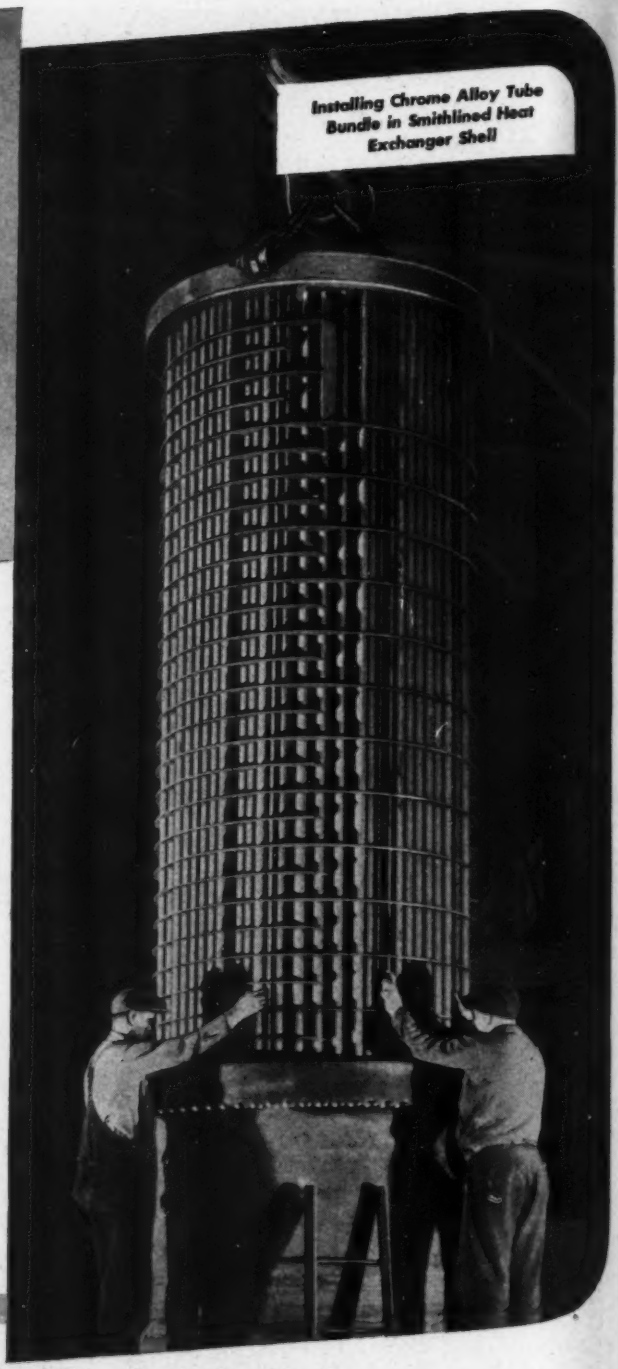

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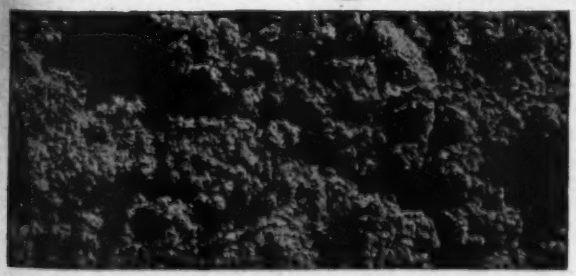

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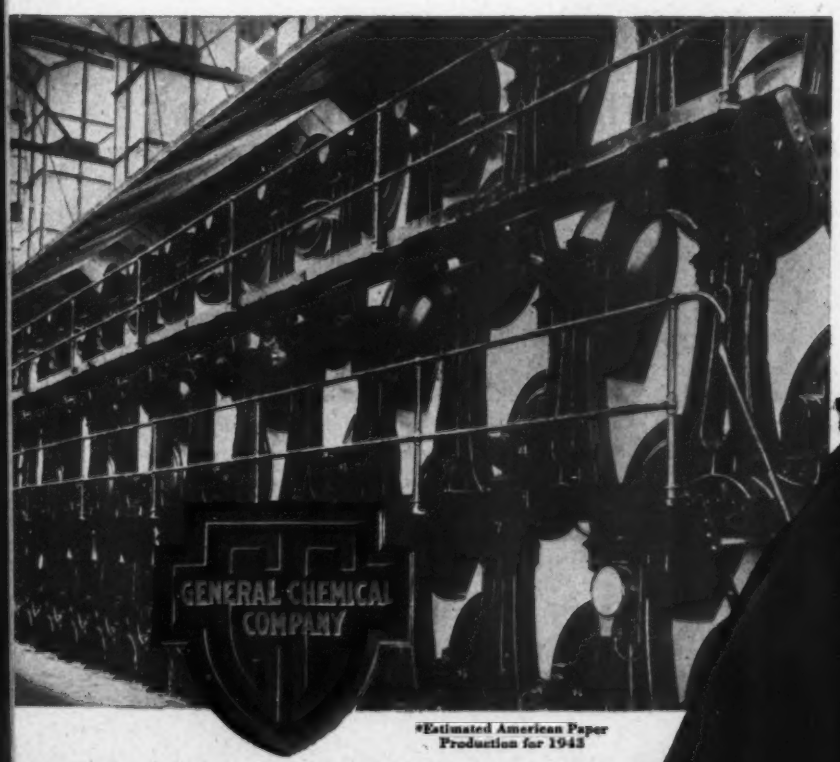


*Estimated American Paper Production for 1943

Prices of Paper and Pulp in Two Wars

Prepared by Jack J. Gottsegen under the direction of Jesse M. Cutts, Chief of the Industrial Prices Division, U. S. Bureau of Labor Statistics

▸▸▸ THE RISE IN PRICES for paper and pulp in primary markets during this war has been only one-third as great as that during the same period of the last war. Nevertheless, recent changes in wood pulp prices have brought the Bureau of Labor Statistics' index of paper and pulp to a new war-time high. April, 1944, prices are 34 per cent above those of August, 1939, and reflect the increasing pressure on the market since the beginning of European hostilities.

During both wars, prices of paper and pulp rose more than the average for all industrial commodities. However, in contrast with the last war, paper and pulp prices during this war have not increased as much as the composite average for all commodities. Moreover, paper prices are at relatively lower levels than either wood pulp or paperboard, whereas the reverse was true in November, 1918.

During the present war, prices have risen intermittently and only briefly during the last half of 1942 did they show any tendency to decline (see chart). In September, 1939, the initial stimulus towards higher prices was created by rumors of scarcity, and Germany's invasion of Norway and the French campaign in the spring of 1940 provided another fillip to prices. During 1941, prices of paper and pulp rose as a result of the growth of general industrial activity and by December they were 28 per cent above their prewar levels. However, orders for paper began to decline by July, 1941, as the fear of rapid price rises was quieted by the actions of the Price Stabilization Division of the Advisory Commission to the Council for National Defense and its successors. In addition, paper production was greater in 1941 than in 1940. Speculation was also curbed by the enactment of specific price regulation by OPACS in the fall of 1941 and of the General Maximum Price Regulation in the spring of 1942. Many buyers stayed out of the market because of their large accumulated inventories, and others ceased to buy because their plants were being converted to war production.

The 1941-42 wastepaper campaign contributed to the impression that there was a paper shortage and that it was unpatriotic to use paper, with the result that prices declined in May, 1942, and by December were about 3 per cent lower than the December, 1941, levels. However, as in the last war, demand for paper products, both for direct and indirect military uses, constantly increased during 1943. At the same time, labor shortages, particularly in woods operation, increased transportation and other operating costs, affected adversely supplies of pulpwood, wood pulp, and finished paper products. As a result of declining inventories and production, and rising production costs, prices have moved steadily upwards since January, 1943.

Prices of practically every type of wood pulp, wastepaper, paper, and paperboard have advanced substantially, and in April, 1944, were 102, 169, 20 and 58 per cent higher (respectively) than in August, 1939. As indicated in the table, advances were greatest for the raw materials of paper manufacture, such as pulp and wastepaper, and greater for paperboard than for paper products.

In contrast to the 1939 price rises, caused by buyers who immediately began to build up inventories, the 1914-15 period was one of price stability and even slight depression in paper and pulp prices. During 1916, prices doubled and continued at their high levels until April, 1917, principally because of shortages of imported pulp, rags, chemicals, and labor. Furthermore, the normal demands for paper were supplemented by the sudden demands arising out of increases in manufacture and trade, by foreign purchasing, and by domestic speculation. This rise was followed by a price decline of approximately 25 per cent, caused by lack of orders following the declaration of war by the United States. Prices rose again early in 1918 as demand both by the Government and by private industry increased. In addition, fuel shortages somewhat reduced paper production and railroad freight congestion interfered with deliveries. Thus at the time of the Armistice, prices of paper and pulp again reached the high levels prevailing early in 1917.

The relative stability of paper and pulp prices during the present conflict in comparison with the rises during World War I was due to many causes. During the last war, controls were mainly directed over the purchasers and users of finished paper products, and only the price of newsprint was regulated by the Federal Government. The great expansion in papermaking facilities since 1920 has made the industry less dependent upon foreign sources for raw materials and better able to stabilize prices. Price ceilings, voluntarily agreed to at first and later established by the Office of Price Administration, also have prevented increases.

Wood Pulp

Prices of pulp were immediately affected by the war because of the wide use of foreign supplies. During the decade of the thirties, approximately 27 per cent of the total wood pulp consumed in the United States was furnished by foreign producers. Scandinavian and Finnish chemical wood pulp and Canadian mechanical pulp, in particular, were imported because of their high quality and attractively low prices. The anticipated loss of these supplies had an immediate effect upon the market, and prices continued to rise because of widespread rumors of shortages and shipping difficulties. By December, 1939, increases for wood

Price Increases for Wood Pulp—Selected Periods (In Per cent)

	July, 1941, to		August, 1939, to			May, 1942, to
	April 1917	Nov. 1918	Dec. 1939	July 1940	Dec. 1941	March 1944
Kraft	.....	.....	13	77	93	0*
Sulphite	164	117	29	78	90	12*
Mechanical	118	35	55	67	52	9*
Soda Bleached	.....	.....	14	22	29	9
(*) New Series						

Increase in Wholesale Prices for Certain Paper Products—Selected Periods
(In Per cent)

	August, 1939, to					
	Dec. 1939	Dec. 1940	Dec. 1941	Dec. 1942	Dec. 1943	April 1944
Newsprint	0	0	0	0	16	16
Book	8	16	34	34	34	34
Tissue	6	18	34	36	36	36
Wrapping, kraft	23	31	38	38	46	46

pulp ranged from 13 per cent for kraft to 55 per cent for mechanical. Germany's invasion of Norway set off another rapid upward movement in prices. At a July, 1940, meeting called by Government representatives, spokesmen for the wood pulp industry promised that "unjustifiable price increases would be avoided." As a result of this agreement, and because of an increase in domestic pulp production and in shipments from Canada, markets generally remained unchanged until May, 1941. Prices of kraft and easy bleaching sulphite rose again but were checked by another voluntary agreement in December, 1941, and by formal controls incorporated in MPR 114, effective April 20, 1942.

Since Pearl Harbor, substantial increases in labor, material, and transportation costs have occurred which have been only partly met by a Government subsidy. Therefore, on February 14, 1944, price increases for sulphite, groundwood and soda grades of wood pulp were permitted by OPA to insure needed supplies.

Although during the last war pulp prices increased to an even greater extent than during the present war, their course differed. After a period of stability lasting through 1915, prices rose rapidly in 1916 and continued to move upward until the United States entered the war. For example, the price increase from July, 1914, to April, 1917, for sulphite, news grade, and easy bleaching, was 164 per cent and for No. 1 domestic mechanical, 118 per cent. However, in the period following our declaration of war the prices of the two types of wood pulp moved in different directions. Prices for mechanical wood pulp fell in April, 1917, and continued downward so that by November, 1918, they were only 35 per cent above the prewar level. The price of sulphite recovered almost immediately following the April, 1917, slump, and by November, 1918, was 117 per cent above that of July, 1914.

Some indication of the increasing costs of raw materials during this war is furnished by the movement of pulpwood prices. Between October, 1940, and March, 1944, the average price per cord of southern pine pulpwood rose approximately 90 per cent, and the price of peeled spruce in the Lake Central region rose 70 per cent between 1939 and 1942, and an additional 10 per cent in August, 1943. Furthermore, on May 1, 1944, OPA established maximum prices on imported pulpwood produced in the Canadian Provinces of Quebec, New Brunswick and Nova Scotia, in order that Canada might repeal its Timber Control Order No. 20, passed in July, 1943. The purpose of this Act was to prevent a diversion of Canadian supplies to American mills which were paying more than Canadian ceiling prices for this wood. In 1943, shortage of woods labor, in particular, caused rapid declines in pulpwood and wood pulp production and is the principal cause for prospective paper shortages in 1944. During the last war there were similar rises. In 1918, it was stated by the International Paper Company that "pulpwood costs 102 per cent more than prior to 1910, 49 per cent more than in 1915, 26 per cent more than last year, and the cost is increasing every month."

Wastepaper

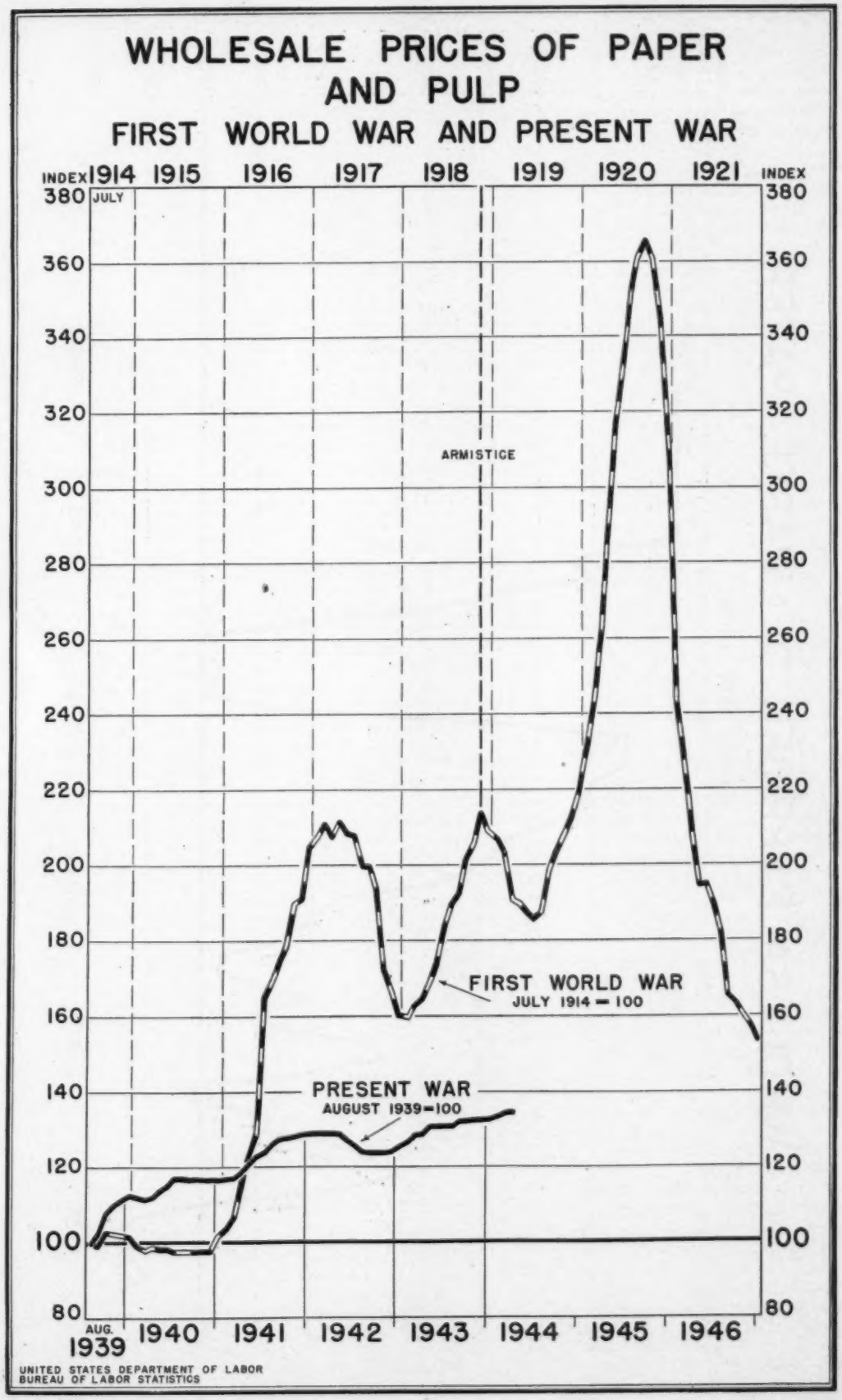
Wastepaper prices, varying much more widely than base prices for pulp or paper, are a sensitive reflector of the trade's opinion of conditions prevailing in the market. (see chart). The reaction to Germany's invasion of Poland was immediate, and within a month prices for wastepaper averaged 72 per cent above August, 1939, levels. However, the realization that no raw material shortages existed and that business in general was not receiving large war orders had such a depressing effect upon the market that by April, 1940, quotations dropped slightly below their prewar level. The further German successes in the West in the spring of 1940 brought another rise, and by June, 1940, wastepaper prices averaged 65 per cent above those of August, 1939. In the summer of 1940 reaction set in a second time since there were still no actual shortages and by the year's end prices once again returned to their prewar levels. With the beginning of 1941 the demand for paperboard products increased greatly, and wastepaper prices advanced for a third time and by June they were 85 per cent above their prewar levels. In the summer of 1941, leading representatives of the wastepaper industry agreed with OPACS to maintain prices but further increases occurred, and the prices of wastepaper were formally controlled by OPA in October, 1941.

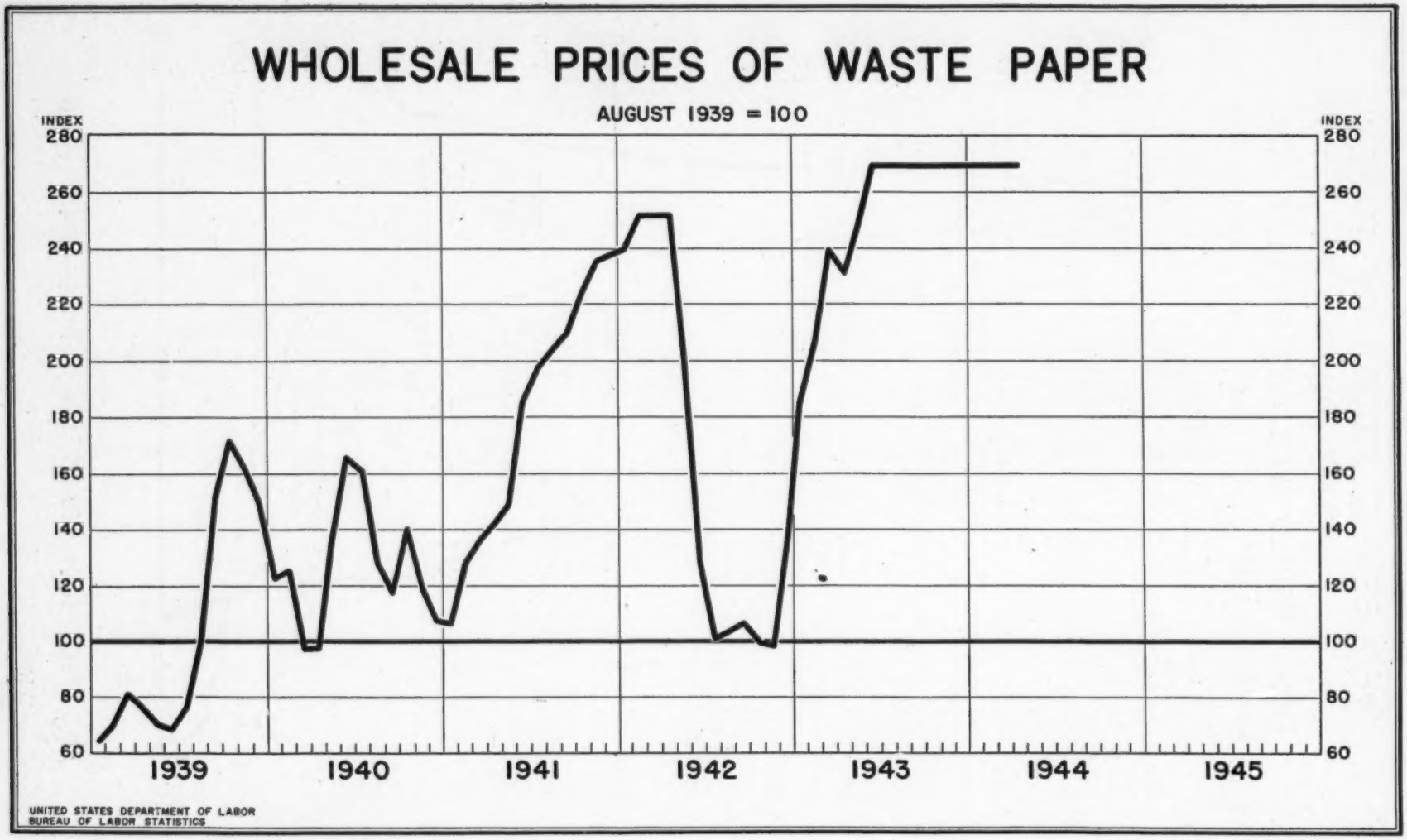
During 1942, a third market collapse occurred, principally because the first wastepaper saving campaign produced large amounts of stock which consuming mills did not buy. In four months, wastepaper prices declined almost 60 per cent. The decrease was even greater for mixed waste, the price of which fell from $14 a ton in April, 1942, to $3 a ton in July, 1942. Despite lower prices, inventories in the hands of wastepaper dealers continued to increase and many dealers burned their wastepaper. However, war demands, principally for paperboard, increased further with the result that prices began to rise again, and by June, 1943, all grades of wastepaper were selling at ceiling prices. The tight supply situation in wastepaper is at present a real threat to paper production, and the goal set for the present salvage campaign is 66 per cent of the recoverable supply in contrast to the 38 per cent recovered in 1941, and 42 per cent in 1942, when the wastepaper campaign caused market prices to drop. In addition, wastepaper shortages have created a chaotic market. Many mills are buying directly from sources of supply and OPA is combatting black market operations.

During the last war, prices of wastepaper did not vary so much, but followed paper prices more closely. According to data prepared by the War Industries Board during 1914 and 1915, prices were relatively stable, but during 1916 they rose rapidly, and by April, 1917, were almost 130 per cent

Percentage Changes in Wholesale Prices of Wastepaper —Selected Periods

August, 1939, to	Books and Magazines	Old Corrug. Boxes	No. 1 Mixed	Folded News	All Wastepaper
October, 1939	+ 77	+ 64	+ 80	+ 67	+ 72
April, 1940	+ 27	— 10	— 22	0	— 3
June, 1940	+120	+ 61	+ 39	+ 52	+ 65
December, 1940	+ 27	0	— 13	+ 22	+ 8
June, 1941	+100	+ 89	+ 84	+ 69	+ 85
October, 1941	+215	+ 88	+116	+ 99	+124
April, 1942	+227	+142	+144	+107	+152
July, 1942	+115	+ 3	— 48	— 10	+ 1
June, 1943	+248	+179	+144	+122	+169
April, 1944	+248	+179	+144	+122	+169


WHOLESALE PRICES OF PAPER AND PULP
FIRST WORLD WAR AND PRESENT WAR
INDEX
1914
1915
1916
1917
1918
1919
1920
1921
INDEX
JULY
380
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
ARMISTICE
FIRST WORLD WAR
JULY 1914 = 100
PRESENT WAR
AUGUST 1939=100
AUG.
1939
1940
1941
1942
1943
1944
1945
1946
UNITED STATES DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS


WHOLESALE PRICES OF WASTE PAPER
AUGUST 1939 = 100
INDEX
280
260
240
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200
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160
140
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100
80
60
1939
1940
1941
1942
1943
1944
1945
UNITED STATES DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS

Increases in Wholesale Prices of Paperboard and Paperboard Items*
(In Per cent)

	August, 1939, to						
	Dec. 1939	Dec. 1940	Oct. 1941	Dec. 1941	Dec. 1942	Dec. 1943	April 1944
Paperboard	33	23	50	53	35	58	58
Chipboard, No. 90 or heavier, unlined	35	12	39	39	30	48	48
Single Manila, Lined	29	22	38	38	31	36	36
85-lb. liner	37	30	79	85	40	91	91
Corrugating paper	37	32	43	57	49	72	72

(*) Average for eastern and central territories.

above those of July, 1914. Within the next twelve months prices declined by 47 per cent and rose rapidly again from May to September, 1918. In November, 1918, the price of mixed waste was again 130 per cent above its prewar level.

Paperboard

The conditions underlying the fluctuations in the wastepaper market caused paperboard prices to follow a similar pattern. In general, these prices rose rapidly immediately after the outbreak of war in Europe in 1939 and declined slightly during the early months of 1940 while military activity in Europe was quiescent. Prices again rose moderately during the summer months as the French campaign proceeded but by the year's end their average was below that prevailing in December, 1939. During 1941, paperboard prices rose rapidly, stimulated by the inability of wastepaper dealers to control prices as promised in the June agreement. Formal price controls were established in the early fall for paperboard as well as wastepaper. As indicated in the table, prices for paperboard items declined during 1942 and rose again during 1943.

The present price level for paperboard is approximately 58 per cent above that of August, 1939. The larger increases for the items used in containerboard reflect the nature of the greater military demands. For example, prices for 85-pound jute test liner are 91 per cent above their prewar levels whereas prices of single Manila lined chipboard have risen only about 36 per cent.

During the last war, paperboard prices moved in the same manner as other paper prices. After a period of stability, prices rose in 1916, and by April, 1917, were 115 per cent above July, 1914. Price declines from May to December, 1917, brought the average down to about 57 per cent above the prewar level. In 1918, prices rose again and by November, 1918, were 111 per cent above the July, 1914, average.

Paper

With the exception of newsprint, prices of the various kinds of paper rose immediately with the declaration of war by the European powers on September 3, 1939. The sharpest rises occurred prior to Pearl Harbor, and prices have been relatively stable since then. In contrast with the last war average prices for finished paper products during this war have increased less than those for wood pulp and paperboard.

The prices for book, tissue, writing, and wrapping papers have risen rather sharply, in comparison with the relatively stable prices of the prewar period. Between August and December, 1939, prices for book paper rose 8 per cent, tissue 6 per cent, manila wrapping paper 6 per cent, and standard Kraft wrapping paper 23 per cent. "Scare" buying and inventory building were responsible for further price increases during 1940 and 1941. Prices leveled off by the end of 1941, as the result of voluntary agreements and by responses of the industry to the price freeze requests made by the Office of Price Administration. Subsequently prices were controlled either under General Maximum Price Regulation or by specific price regulations.

Per cent Increases in Wholesale Prices for Selected Periods

	July, 1914, to			August, 1939, to			
	April 1917	Dec. 1917	Nov. 1918	Dec. 1941	Dec. 1942	Dec. 1943	April 1944
Paper and pulp	111	60	114	28	24	33	34
Wood pulp	157	40	105	84	85	85	102
Wastepaper	——	——	——	138	38	169	169
Paper	87	68	115	16	13	20	20
Paperboard	115	57	111	53	35	58	58
All Commodities	70	83	103	25	35	38	39
Indus. Products	67	77	99	20	26	27	28

When newsprint prices were formally controlled by OPA on April 28, 1942, the level of prices established was that which had prevailed since January 1, 1938. However, since 1941 the industry has been confronted with rising costs principally in woods operations and transportation. Canadian producers, who supply 75 per cent of the newsprint requirements of the United States, were also affected by rising production costs. To compensate for these and to maintain production, the Office of Price Administration, acting jointly with the Canadian Wartime Prices and Trade Board, permitted two advances in ceiling prices, in March and September, 1943, which raised the price of newsprint approximately 16 per cent above its prewar level.

During the last war, prices of paper products were quite stable until 1916. Increases during 1916 and early 1917 carried paper prices to 87 per cent above their prewar levels. Declines, smaller than those for paperboard and pulp, occurred during the summer months and by December, 1917, prices of paper products were 10 per cent below their April averages. Prices again rose in 1918 and by the war's end were 115 per cent above July, 1914, levels.

The price movement of "cultural" papers versus that of "industrial" papers during the two war periods may be illustrated by comparisons between prices of newsprint and wrapping paper for these two periods. During the present war, a price rise of only 46 per cent has been recorded for standard kraft wrapping compared with the 156 per cent increase for manila wrapping during the last war. On the other hand, the price of newsprint did not rise as greatly as that of wrapping paper. The 16 per cent price rise for newsprint during the present war is considerably less than the 87 per cent increase which occurred during World War I. In the months immediately after the Armistice there was some slight decline, but prices again moved upwards and by November, 1920, averages for both newsprint and manila wrapping paper were at a level approximately three times that of July, 1914.

Market prices of paper and pulp have not risen nor fallen as sharply in this war as in the last nor have their fluctuations been identical within the same time periods. However, they have moved in much the same way during two world wars. In both wars, the period prior to the entry of the United States as a belligerent was one of market rises and the period following the declaration of war one of market declines and subsequent price rises.

Source of data used in tables: *U. S. Bureau of Labor Statistics.*

Pulpwood Transportation in the Lake States

J. V. MARTIN
Consolidated Water Power & Paper Co.

▸▸▸ IN THE LAKE STATES region there are about forty pulp mills located in the States of Wisconsin, Michigan and Minnesota. There is also one mill in Ohio and one on the Pennsylvania shore of Lake Erie. These mills manufacture sulphite, sulphate, soda, and groundwood pulps in a total amount that represents about one-sixth of the country's total wood pulp production. They likewise use about one-sixth of the pulpwood consumed annually in this country.

These mills use spruce, fir, hemlock, pine, tamarack, poplar and miscellaneous northern hardwoods, as well as relatively minor quantities of slabs and other sawmill waste. Although the mills are concentrated in a relatively small area, three-quarters of them being within a circle whose radius is one hundred miles, probably about half the domestic wood used moves less than one hundred miles to the mill that consumes it. The balance, domestic and imported, comes mostly from lands located within about four hundred miles of the consuming mill, although a small percentage may be transported as far as 1,500 miles.

The railroads, waterways and highways each play an important part in transporting pulpwood to the mills in the Lakes States region. A significant fact, however, is that in recent years not much wood reaches a mill yard without having been transported, if only for a short distance, by a motor truck.

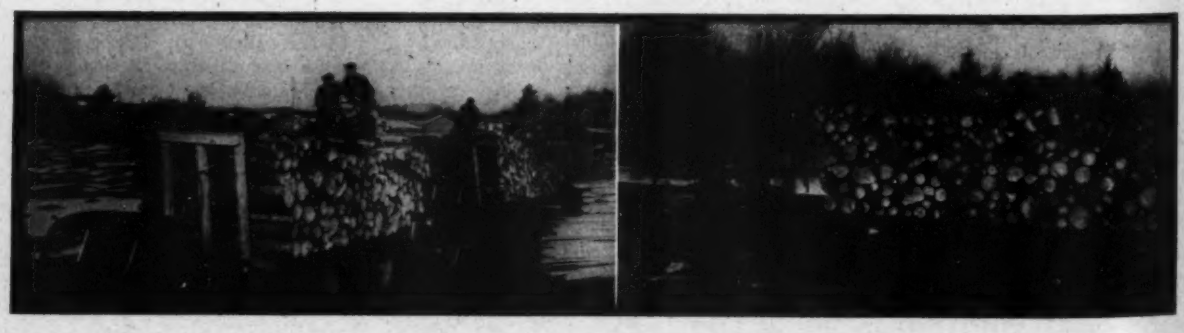
The Great Lakes and connecting waterways provide practical and important facilities for the transportation of pulpwood. Mills located in the region can transport wood by barge or steamship from sources which may be scattered from the Lower St. Lawrence River to the head of the lakes. Lake vessels carry cargoes that vary from 300 cords to 3,000 cords depending on the size and type of vessel that may have been used because of the conditions affecting any particular movement. Boats carrying wood up the St. Lawrence River are limited in length, beam and draft by the dimensions of the canal locks and the depth of water in these locks. Boats in this trade, called "canalers," are about 250 ft. long, 40 ft. beam, 14 ft. draft when loaded and carry 1,200 to 1,500 cords of peeled wood. Boats transporting wood between points on the upper lakes are limited in size only by the dimensions and depth of water in the locks at Sault Ste. Marie. The cargoes carried by these vessels usually vary between 1,500 and 3,000 cords, although smaller vessels of 300 to 1,500 cords are used under special conditions. Movements of wood between points on Lake Superior are commonly handled by rafting in large bag-rafts of approximately 10,000 cords, towed by a tugboat. Rafting is generally cheaper transportation than vessel movement, but is limited to moving large quantities of wood; it is further limited by weather conditions to about three months time in the summer when bad storms are not likely to occur. A tugboat with a raft in tow is not adapted to weathering a heavy storm, and, as it normally travels at the rate of about one mile per hour, it cannot reach shelter very quickly.

Wood transported by barge, steamer or raft reaches the port of shipment by rail, truck or perhaps by river-drive.

When the receiving mill is not located on a lake port, the delivery, whether by raft or vessel, is generally completed by transferring the wood to railroad cars at the nearest port of entry for delivery to the mill yard. The larger portion of the wood transported to Lake States mills by water is imported wood, although some of it originates on domestic lands. Transportation by water is possible only during the open season of navigation, which lasts approximately six months per year.

The common carrier railroads deliver the larger part of the domestic wood used by mills in this region and also a considerable portion of the imported wood. A good network of railroads connect the mills with the wood-producing areas, and in some places, private logging railroads connect or have in the past connected with the common carriers. In former times pulpwood was cut in the fall and early winter on large or medium-sized operations and was then sleigh-hauled on snow-roads or ice-roads to the railroads where it was loaded on cars for delivery to the mills. This, of course, was a strictly seasonal operation, and mills that did not receive wood transported by water in the summer had to take in their entire year's requirements during the winter, reaching a peak inventory late in February or early March.

The introduction of motor trucks in woods operations as an alternative to horse-drawn vehicles began about fifteen years ago and has grown so rapidly that except for skidding from the stump to roads, horses have been almost completely supplanted. The conditions that favored the increased use of trucks included: (1) low-priced trucks, capable of carrying heavy loads at moderate operating costs; (2) a well-developed network of all-weather public main highways and secondary highways; (3) the development of bulldozers and other road machinery capable of making suitable logging roads at moderate costs; (4) the existence of large quantities of pulpwood either in places that were beyond practical horse-hauling distance of railroads



LEFT—Trucks and trailers equipped for hauling pulpwood, 6 to 8 cords per load. Here wood is being unloaded from trucks to gondola cars by hand (Wisconsin). RIGHT—Truck (1½ ton) with detachable trailer. Load approximately 7 cords (Wisconsin).

or in areas whose terrain was too rough and difficult for horse-hauling.

At the present time there are few forest areas in the Lake States that have not been demonstrated to be within practical truck-hauling distance of a railroad; and every farm woodlot, as it matures, has an outlet to market via the truck. The development of truck transportation has been of significant importance to the Lake States pulp mills in making available wood produced on the scattered operations of farmers and small operators, since such wood now makes up the bulk of the domestic production. Trucks have also changed the seasonal character of the logging operations, because many areas can now be logged in the summer as well as, and sometimes to better advantage than in the winter. Trucks have not only replaced horse-drawn vehicles for the hauls from the woods to railroads but also compete with railroads in movements up to 75 or 100 miles. Some Lake States mills receive up to 75 per cent of their domestic requirements by truck direct from woods operations.

Many of the trucks used in pulpwood hauling operations are so-called one and one-half ton models with a rack about 12 ft. long and 4 ft. or 5 ft. end-stakes. The load carried varies between two and one-half cords and four cords, the larger loads generally being peeled wood. Some trucks are equipped with a semi-trailer which permits the use of racks up to about 20 feet in length, thereby increasing the loads carried to about five or six cords. Other trucks have been used successfully such as the heavier two-ton and three-ton trucks, four wheel drive trucks, tandem drive trucks, and trucks modified by home workmanship to incorporate some novel ideas of the owner.

When pulpwood is cut in log-lengths, instead of four-foot or eight-foot lengths, trucks equipped with semi-trailers are almost invariably used for hauling these logs. The volume hauled per truck varies between 1,500 and 3,000 board feet (Scribner), with an average of probably 2,000 board feet. Another type of truck use is found in winter logging operations where they are used to draw loaded sleighs when conditions such as a large volume of production in a small area, favorable terrain, and the distance of the haul make such use of trucks more economical than putting the load on the trucks themselves. In this kind of operation, each truck may draw 12 to 15 cords per trip, and under exceptional conditions may draw up to 25 cords.

For summer use, trucks have proved to be both flexible and economical. In certain types of timber located on drier soils, such as is found in some jackpine stands, trucks have been used to haul pulpwood directly from the stump to railroad siding or mill yard, without the intermediate step of skidding to main roads. This, of course, represents an important saving in operating costs. In other timber-types on the drier soils where skidding is still necessary, the extra cost of building summer roads is usually offset by the eliminated expense of plowing and maintaining winter roads. Even on the wetter and softer soils found in swamps and in clay belts, where the volume of timber stand is relatively high, it has been found to be economical to build plank roads or "truck-tracks" for use in summer.

Thus the use of trucks for hauling pulpwood has made available additional quantities of pulpwood for mills in this region, has tended to decrease the cost of all wood and has changed the former seasonal character of pulpwood supplies by permitting summer delivery, allowing the mills to maintain a more favorable inventory cycle. An equally important result has also been the satisfactory way in which trucks fit into the now fairly common practice of selective logging which is a part of the long range plans for insuring a continuous future supply of pulpwood.

ABOVE—Truck and log trailer hauling hemlock logs (Michigan). CENTER—Pulpwood being unloaded from trucks to cars by hand (Wisconsin). BELOW—Large quantities of wood are hauled by trucks from small pulpwood operations. Loads of 2-3 cords are hauled and either loaded on railway cars or decked on landings at railroad.

THE SUPERVISOR—*Today and Tomorrow*

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Division of Education and Applied Psychology
Purdue University

▸▸▸ IN EVERY INDUSTRY the job of the foreman has undergone many changes during the past ten years. Still more, and perhaps greater, changes may be in store for industry the next ten. Not many years ago the foreman hired and fired entirely "on his own"; he set the rates for different jobs in his department; he served as his own safety expert, motion study expert, and disposed of all problems of industrial relations without seeking or obtaining help from anyone else.

During the past decade much has happened to the policies of technology, government, and general industrial relations. These developments have affected and will continue to affect the foreman's job.

Technical changes and improvements also have made it well nigh impossible for the foreman to continue to "stand on his own." Few supervisors can hope any longer to be real experts in all of the varied technical phases of their own work. The equipment and processes have become too complex and too specialized to permit any one man to be self sufficient. This has made it necessary for the foreman to use the services of *experts whose job is to help him.* The job evaluation specialist is not hired by management to *replace* the supervisor, nor is he hired because he knows more about the jobs than the supervisor. Usually he does not, and if he is experienced in practical job evaluation, he will admit his lack of knowledge about the many specific jobs he must evaluate. But he comes to his task armed with a well tried *system* which reasonably well fits all jobs. By obtaining certain information about each job from the supervisor or from experienced operators (or both), the jobs can be fitted into a pattern of relative worth so that there is less chance of certain jobs in certain departments being far "out of line" with other jobs in other departments. Probably the services of a job evaluation specialist would not be necessary if one foreman were responsible for all jobs. But in a plant of any size this is not possible. When some unifying principle of evaluation is not followed on a plant-wide basis, many supervisors find dissatisfaction arising in their departments among men on jobs that are paid low (in comparison with other departments), and they might easily (and without intending to do so) contribute to dissatisfaction in other departments by paying too high a rate on other jobs.

These problems of rate alignment are greatly reduced by the specialist in job evaluation. It is not the purpose of this article to suggest any particular system as being the *best* system to use. Different systems have different merit in different plants. But when a system has been accepted and put into operation, the supervisor who adopts a wholehearted attitude of co-operation with the specialist, will find his own job made easier, his grievances and problems of general dissatisfaction reduced, and the way paved for a better understanding by his men of matters of company policy in relation to wages.

The specialist in this instance—as in the case of all other specialists—is hired *to help the supervisor do a better job.* The specialist is not a competitor nor a rival of the foreman. Really, he is an assistant. This is true not only of specialists in job evaluation but of all specialists—those in safety, motion study, time study, training, company policy, and personnel.

But the supervisor cannot delegate all of his problems to specialists, no matter how many of them are available or how thoroughly he is willing to co-operate with them. Some things he has always done and must continue to do, and there are some new things he must do today that were not part of his job a few years ago.

He is, of course, first and foremost, responsible for production. But it is his men—not he—who actually get this production out. Bottlenecks are, therefore, of two types: machinery or process bottlenecks, and human bottlenecks. Every foreman realizes that he should know the technical details of his job, and management has in general been quite careful in giving the supervisory job only to men who thoroughly know the job from a technical viewpoint.

But neither management nor the foreman always has been so careful in recognizing the importance of human bottlenecks. Management, and many foremen on their own initiative, are beginning to give proper consideration to the human relations aspects of the foreman's job. But to handle these problems in a satisfactory manner requires training just as surely and as carefully planned as training in the care and operation of equipment. Management largely has recognized this training not only as a managerial function but as a managerial responsibility. It has installed and operates supervisory training programs which train supervisors on company time in such matters as the operation of company policy in regard to grievances, seniority, layoff, wage incentives, and group bonuses. Often the training program also deals with the effects on the foreman's job of governmental laws and regulations such as the Fair Labor Standards Act, the Wagner Act, and various directives issued by governmental agencies such as the War Labor Board.

To illustrate the approach of a supervisory training class or conference to a typical problem, consider the development and handling of a grievance. There are several possible ways (some right and some wrong) to handle a grievance. In the conference, the leader may well point out, at the beginning, that *a grievance does not arise unless there is a certain amount of stored up dissatisfaction, discontent, or (in some cases) downright anger.* We can therefore outline the steps in the development of a grievance as follows:

1. The storing up period. Something or other (it may be real or it may be imaginary) develops that the employee does not like. He thinks about it, talks it over with his fellow employees, his wife, and perhaps his friends outside the plant. Whether or not the grievance is really justified, the persons the employee talks to at this stage *usually agree with him because they only see his side of the case.* These talks thus give him courage and lend support to his feeling that the grievance is justified. This increases his discontent, and the process continues until he finally decides to take up the matter with his foreman.

During this "storing up period" the foreman, more often than not, is unaware of the budding grievance. But while it is developing production suffers. The employee cannot and does not give his best effort to his job while he is worrying about the real or alleged grievance. The "storing up period" is one of reduced production, poor quality, and possibly increased likelihood of accidents to men or machinery. At this stage it is the foreman's duty to be alert for unexpressed grievances, for slowdowns that may be caused by

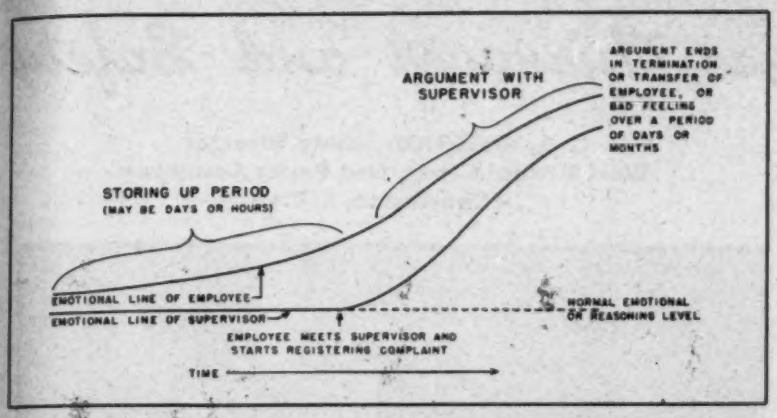

ARGUMENT WITH SUPERVISOR
ARGUMENT ENDS IN TERMINATION OR TRANSFER OF EMPLOYEE, OR BAD FEELING OVER A PERIOD OF DAYS OR MONTHS
STORING UP PERIOD
(MAY BE DAYS OR HOURS)
EMOTIONAL LINE OF EMPLOYEE
EMOTIONAL LINE OF SUPERVISOR
NORMAL EMOTIONAL OR REASONING LEVEL
EMPLOYEE MEETS SUPERVISOR AND STARTS REGISTERING COMPLAINT
TIME

Fig. 1—How a grievance is likely to develop if the supervisor or foreman argues with the employee or "hits the ceiling."

smouldering troubles, and for other evidences of dissatisfaction that has not yet been openly expressed. It is the foreman's job to get the expression made openly so that it can be handled fairly and thus removed. *Remember, nothing can be done about a grievance until it has been expressed openly, but in this pre-expression stage it can cause most of its trouble.* Sooner or later the grievance will usually develop into the next stage which is:

2. Presentation of the grievance.* When the grievance is presented, we must remember that it now represents so much stored up dissatisfaction that the employee no longer can keep it to himself. Therefore it is similar on the emotional level to a keg of dynamite, and the presentation of the grievance may be the match that ignites the fuse. When the grievance is presented, the foreman has two—and only two—basic methods of reply. He can argue, "hit the ceiling," or criticize the employee. If he follows this approach, the diagram in Figure 1 illustrates the most likely development of the grievance.

Figure 1 shows what often happens if the supervisor does what is easiest and most natural for all of us to do, i.e., fight back. A good employee may be lost. The supervisor will lose the respect of other employees, for men do not really respect a foreman who loses his temper enough though they may attempt to hide their lack of respect. The department head may have to be called in. And in spite of these attempts to "save the situation," the employee may well be lost to the department or to the company. *When a trained employee leaves he takes with him the training, skill, and experience that the company has paid him to develop.*

There is another, a simpler, and a far more effective way to handle grievances. It is based on the old adage that "it takes two to make a fight." It involves (1) hearing out the story, (2) calming the employee, and then (3) doing something about the grievance. When this course is followed the diagram in Figure 2 more nearly represents the course of the grievance. It is a well-known psychological principle that logical and factual discussion is greatly handicapped (and often rendered impossible) by emotion or excitement, particularly anger. The method of handling a grievance suggested in Figure 2 therefore, involves "hearing out" the employee before any attempt is made to discuss with him the merits of his case.

Carefully worked out "Key Points" (lettered) which help the supervisor during the three stages (numbered) of the recommended method are:

1) Listen to his story

a. Stay calm and cool.
b. Put him at ease.
c. Give him all the time he needs.
d. Show him that you are interested in his story.

2) Calm him

a. Use questions that require no answer, such as:
"That so?"
"You did?"
"That right?"
"Wrong?"
"Yes?"
"They did?"
"Too heavy?"
"Sure enough?"
"You didn't?"
"Too light?"

b. Assure him that you see his viewpoint, using such statements as:
"I understand your viewpoint."
"That is a natural way to look at things."
"No doubt you have a good reason for feeling that way."
"I understand what you mean."
"I can see why."
"That is an important point."
"You may have a point there."

3) Do something about the grievance

a. If necessary, starting with benefits, question him to get more facts.
b. Starting with benefits, give answer or set definite time for answer.
c. If employee wants to go higher, arrange it for him and notify your superior.

This method of training supervisors to handle grievances is one unit of a series of supervisory training classes in use at the Republic Aviation Plant in Evansville, Indiana. Its value has been amply proved in practice and it illustrates the approach made to supervisory training in the many phases of the foreman's job. Similar instructional units on other topics have been prepared and make up a series of classes or conferences which all supervisors attend.

The supervisor today, and to a greater extent tomorrow, must deal with his men on a basis of mutual re-

(Concluded on page 461)

(*) The following discussion of how to train foremen to handle grievance is based upon one unit of the supervisory training program of the Republic Aviation Corporation, Evansville, Indiana. The training program is under the direction of J. J. McNamara. The charts reproduced in describing this program are adapted from charts used at Republic.

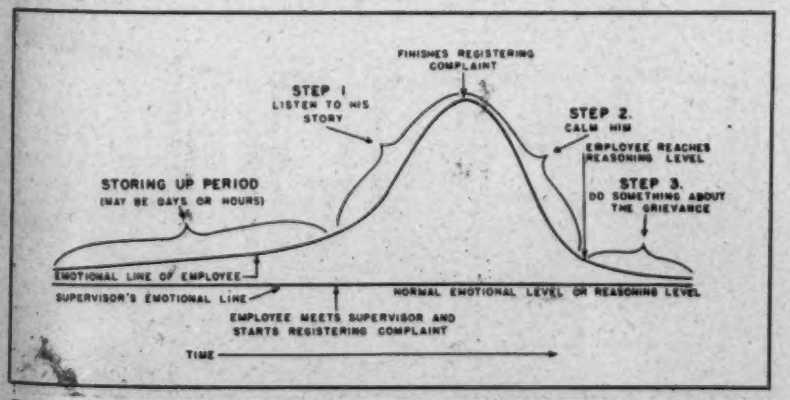


Fig. 2—How a grievance may be handled more effectively if the supervisor follows certain specific steps when the grievance is presented.

High Employee Turnover and Safety

C. A. HOWARD, Safety Director
West Virginia Pulp and Paper Company
(Charleston, S. C.)

▶▶▶ A SAFETY HONOR—its president's trophy—coveted by the mills of the West Virginia Pulp and Paper Company, was awarded to the company's Charleston (S.C.) mill in 1941. The severity rate for the year was .95. This bronze plaque is awarded each year to the mill with the greatest improvement in its safety record.

In 1942, the severity rate jumped to 5.3. In 1943, it increased to 8.2.

Probably the main reason for this high increase in severity rate was due to a large turnover in personnel. Roughly, the turnover increased tenfold during the two-year period (1942-1943) over that of 1941.

There also was another factor which played a part in this increase in the severity rate. Because of confusion incident to the high labor turnover and an unusually heavy production demand for paper, safety was sacrificed, or possibly forgotten to some extent.

During the third quarter of 1943, with this unsatisfactory condition confronting the management, a full-time safety director was appointed and a new safety program was made effective.

One of the first moves in the functioning of the new safety program was the holding of a daily meeting for new employees. At these meetings, in addition to a 30-minute talk, pointing out certain hazards and touching upon safe practices, one of two sound films is shown. One film shows how to protect the eyes; the other how to lift and handle heavy objects in the proper manner, thus avoiding back strain and hernia.

Since October 3, 1943, to May 1, 1944, approximately 540 new employees have attended these meetings. From this entire group there has been only one lost-time accident, and only five of the new employees have suffered minor injuries.

Plant nurses and the ambulance.

Before these meetings were started, the situation was quite different. At that time the majority of lost-time accidents, as well as minor injuries, were occurring among new employees.

Another undertaking in the carrying out of the new safety program was the appointment of a safety committee of 27 members and an alternate for each. Under this setup, there is a committee member or alternate on duty in each department on every shift.

These committeemen and alternates are doing a splendid job, particularly in investigating and reporting on minor accidents. In the case of a lost-time accident, a special committee is chosen from the members of the safety committee to investigate and to make a written report on the findings.

One of the most important acces-

Views of the first-aid room

sories of the safety program is the first-aid department. This department is under the direct supervision of the company physician, who is on call at all times, and is scheduled to be at the plant on Tuesday and Friday mornings for a two-hour period each of the two days. In his absence, a head nurse is in charge of the operation of the department, as well as of the other nurses who work the second, third and x shifts.

The first-aid department is completely modern and exceptionally well equipped. It consists of two waiting rooms, a main room for treating minor injuries, a private room for diagnosis and examination, an office, rest room, and storage space for the mill ambulance. The ambulance also is modern and completely equipped.

The first aid department, located on the ground floor of the main shop building, is right in the heart of the mill. It is quickly and easily accessible to the most hazardous operations. It covers approximately 700 sq. ft. of floor space.

In operating the first aid department, there is a registered nurse on duty 24 hours a day. Minor injuries and dressings are taken care of immediately.

All employees are instructed to report to first aid for immediate treatment following an injury, regardless of the seriousness of the injury. A card with these instructions printed upon it is supplied each employee. Failure of an injured employee to report for immediate treatment brings a reprimand from the employee's foreman if the foreman should learn of the injury.

MINOR ACCIDENT REPORT

TO SAFETY COMMITTEE

Date.....

To.....Safety Committeeman

.....Department

.....was treated in the First Aid Room

for the following injury.....

.....

He will probably lose.....Days.

Injured states accident happened in the following manner.....

.....

.....

Report of Safety Committeeman.....

.....

.....

Signed.....

Through the co-operation and work of the first-aid department and the safety committee, the accident and injury record of the mill has been steadily improving. Without the first aid department and its staff of nurses, the improvement which has been made since starting the new program would not have been possible.

For a recent six-month period, the severity rate dropped below 0.63. Likewise, the frequency rate has decreased 28 per cent over the same period one year ago.

An average of approximately 70 minor accidents are treated each month. There also are about 200 re-dressings over the same period.

The mill employs approximately 900 persons. Most of the work in the mill is of a hazardous nature.

The mill realizes that all employees are working under a heavy strain, and that this stress means an unusually large number of accidents. Therefore, believing that "A Stitch in Time Saves Nine," more and more effort is being exerted to keep employee injuries at a minimum.

The Supervisor

(Continued from page 459)

spect and understanding. Handling men is a *skill*, and like any other skill such as operating a typewriter or playing golf, it must be *learned*. It is management's responsibility to supply the instruction; it is the foreman's responsibility to learn the skill. If both management and supervision accept these responsibilities, we can be assured that the supervision of tomorrow will be both sound enough and mature enough to cope with whatever problems the future may bring forth.

◆

Seven "Musts" Which Govern the Reemployment of Veterans

▶▶▶ A simple but practical guide to keep employers abreast of rehiring provisions which apply to returning veterans has been compiled by the Labor Relations Institute, New York. It states that all men or women who were in the particular enterprise's permanent (not temporary) employ on or after May, 1940, and were subsequently inducted into the armed forces —which includes the auxiliary services and the Merchant Marine—are entitled to reemployment, provided:

1) They have been honorably discharged;

2) They are still qualified to perform the duties of the positions they left;

3) They apply for reemployment within forty days after their release;

4) They were permanent employees and not replacements of workers already inducted;

5) The job they left, or one calling for similar skills, still exists;

6) They are willing to accept necessary training to fit them into available positions; and

7) The business has not changed to such an extent as to make it "unreasonable or impossible" to rehire the applicant.

Warning that there will be many cases in which the veteran will claim title to a job even though he is not covered by the regulations, the Institute has advised its members not to take sole responsibility for turn-downs, but rather to consult with the reemployment committeeman of the local draft board, furnishing complete reasons for the rejection.

What is a "replacement" when rehiring veterans? What are the rights of the worker who replaced a draftee, and then was himself inducted into the armed forces? Suppose both veterans are mustered out at the same time, and both apply for their old job. Which one has priority?

The Research Staff of the Labor Relations Institute has analyzed regulations and developments covering the entire scope of reemploying veterans, and has advised its members that replacements and temporary workers are not covered by the Act—a conclusion based on the Federal government's own policy for its own employees.

If replacements return before the original job-holders, the employer is entitled to hire them temporarily. If the original worker fails to return to his job within forty days after being discharged, the replacement becomes the permanent worker.

A Simple Foam Breaker

R. H. STEVENS, Chief Chemist
National Container Corporation

▶▶▶ THE FOAM on the black liquor in sulphate pulp mills, especially mills using highly resinous woods, is often quite troublesome. Some mills have employed rather elaborate means to overcome the difficulties with it. Yet, a simple foam breaker, which uses no moving parts, can be assembled from material usually available in every mill.

Anyone who has blown soap bubbles and has noticed what happens when a bubble is blown against a window screen by a gentle breeze has observed the principle upon which this foam breaker works.

Black liquor foam is simply a mass of bubbles. Therefore, blowing the foam against a sieve with just enough pressure to force it through will break the bubbles. Upon breaking, they form into a viscous mass of soap.

The device consists simply of a pipe, a sieve located within it, and connections for delivering the foam to the sieve and for an air current of moderate velocity so directed as to force the foam through it. Figures 1 and 2 reveal the details.

The portion of Figure 1 designated as Dome Section D-D show the assembled device mounted on top of a tank into which the viscous soap falls and is collected. The foam enters from the black liquor tank through the pipe inlet on the left which ends approxi-

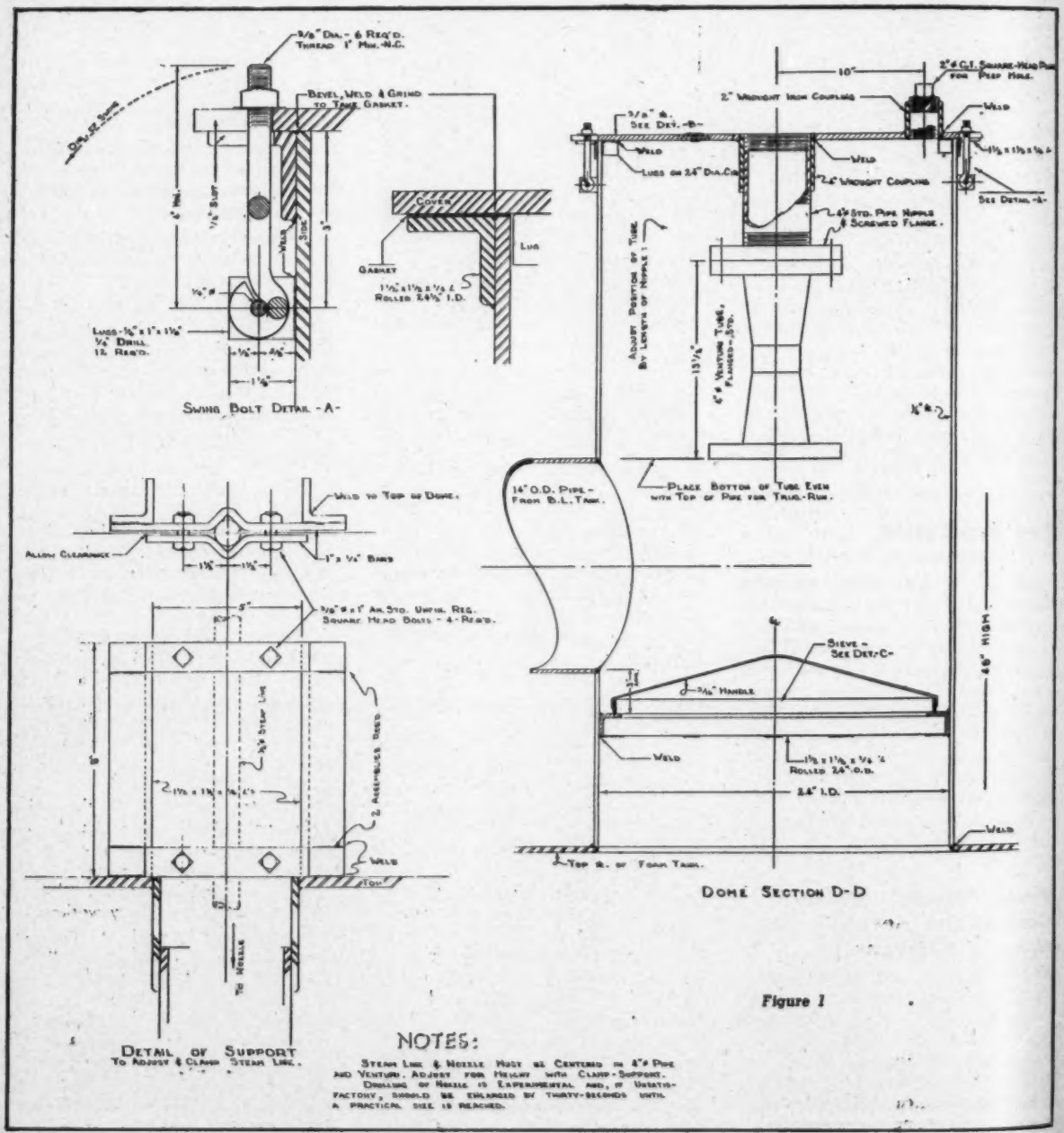

Swing Bolt Detail - A -
Detail of Support
To Adjust & Clamp Steam Line.
Dome Section D-D
NOTES:
Steam Line & Nozzle Must be Centered in 4"ø Pipe and Venturi. Adjust for Height with Clamp-Support.
Drilling of Nozzle is Experimental and, if Unsatisfactory, Should be Enlarged by Thirty-Seconds until a Practical Size is Reached.

Figure 1

mately three inches above the sieve. The air current is formed by a jet of steam at the center of a venturi and is directed down upon the sieve.

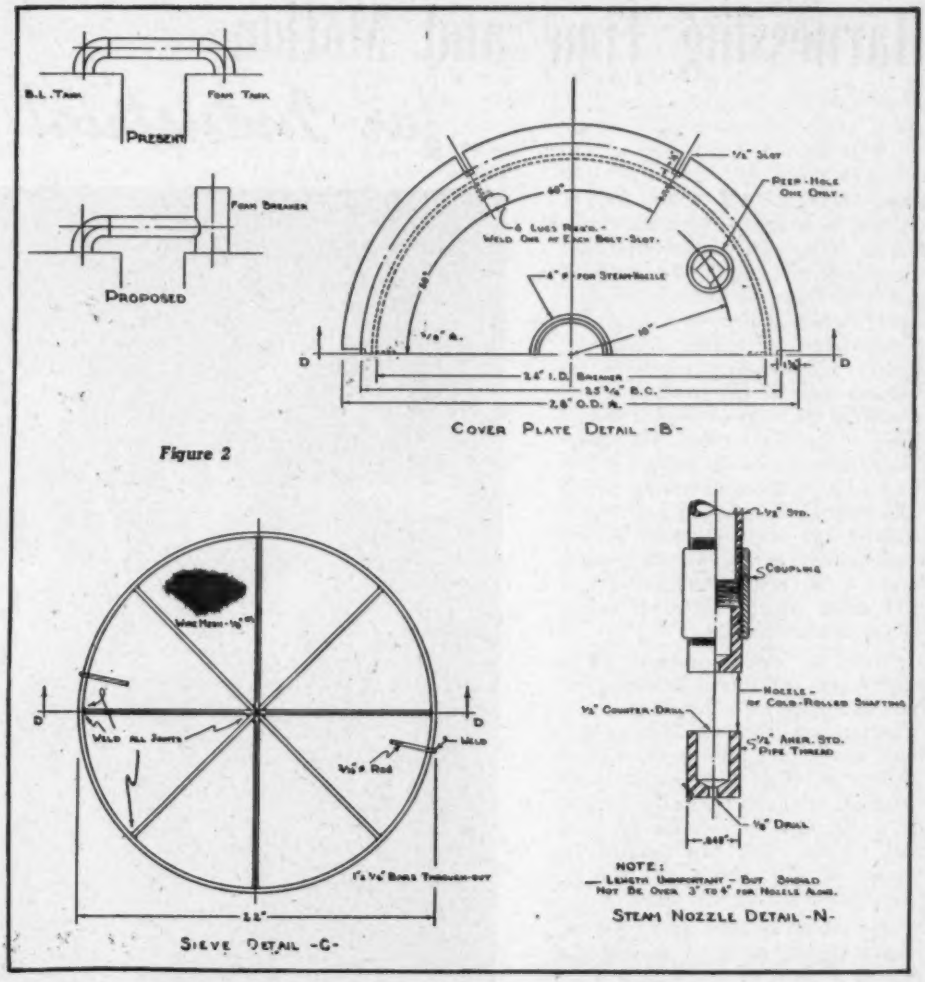
In addition to the Dome Section D-D, Figure 1 shows details for the swing bolts and for the clamp support.

A detail of the steam jet is given in Figure 2. The steam outlet is only ⅛ in. and operating at 130 psi could hardly pass more than 100 lb. an hour.

Other details in Figure 2 show construction of cover plate and sieve. Figure 2 also shows a method of connecting the foam breaker to the foam outlet from a black liquor tank. In this case a vent from the black liquor tank to a foam tank, provided with other means for breaking down foam, was changed to employ the presently described device in the manner illustrated.

Since foam invariably carries fiber, the sieve eventually will become clogged with it. For that reason, it is necessary to arrange for cleaning the sieve occasionally—hence the swing bolts for the cover and the welding of the supports for steam connection and venturi to the cover. To get at the screen for cleaning, it is necessary only to disconnect the ½-in. steam line at a union (not shown in the illustrations) located conveniently above the cover plate with steam valve just beyond, slack off the nuts and throw back the swing bolts, remove the cover, and draw out the sieve with a hook. It is best to have a spare sieve to drop in place immediately and to wash the fouled sieve later. It is necessary, of course, to interrupt the flow of foam temporarily during the change-over as otherwise it would cover the operator and blind him. This interruption may be accomplished either by suspending the washing for a few minutes or by opening a by-pass vent from the liquor tank.

This device has been used for more than five years with good success.



Why Not Pay "Outsiders" for Suggestions?

W. F. SCHAPHORST, M.E.

A well known concern recently awarded a prize of $300 to one of its employees for simply suggesting an improvement in the concern's filing system. The matter of filing was first thoroughly investigated, the suggestion was adopted, and in a short time the change proved so profitable that the officials of the company decided that the suggestion was worth $300.

Your filing system may be all right, but you very likely need *something* that may more than pay for itself in a short time. After paying for itself it becomes an actual "earner," putting real money into your pocket every month. Executives cannot possibly think of everything. Even with the paid co-operation of every employee many good things will surely slip by. So, why not pay *outsiders* for worthwhile suggestions as well as employees? Why bar outsiders?

◆

New Paper Coating Method Uses Soap

The value of soap in paper manufacture is indicated by a recent patent. In U. S. Patent 2,339,707, O. Kress and C. E. Johnson (assigner to the Institute of Paper Chemistry, Appleton, Wis.) describe a method of brightening and opacifying paper, in which soap plays an important role as an emulsifying and dispersing agent. The new procedure comprises treating a pre-formed paper web with an aqueous emulsion consisting essentially of a volatile hydrocarbon liquid with a flash point of about 115-150 Fahr., a water-soluble soap, and an alkaline dispersion of casein. The treated paper web is then subjected to a drying process in order to evaporate the liquid portion of the emulsion and leave the casein on the surface of the paper in extremely fine particle size. *(Association of American Soap & Glycerine Producers.)*

Harnessing Time and Motion *for Industrial Research*

H. D. McLARTY, Research Director
McLarty Business Films

▸▸▸ INDUSTRY HAS BEEN QUICK to recognize the many possibilities of research in the ultra high speed camera. Long limited to the 64 and 128 frames a second of older types (which failed to record the higher speeds of modern tools) designers and research engineers are learning unbelievable. lessons as revealed by the 3,200 frames a second speed of this new camera. Theoretical assumptions are being verified or discredited with uncompromising factual data. Motion is undergoing intelligent analysis and scrutiny, much as was made possible in other lines of research when X-ray, high power microscopes and other scientific research instruments became available.

With this new instrument of research and operational trouble-shooting, mile-a-minute speeds show on the screen in slow-motion at 26 feet a minute; 3,000 rpm's become 15, with all the motion-effects of the higher speeds retained. Motion is reduced to 1/200th of actual. One hundred feet of standard 16 mm. film pass through the camera in 1¼ seconds, yet take 4½ minutes to view on the screen.

The value of high speed photography is not restricted to any one science or field of research. It is not even restricted to so-called major problems. The medium provides accurate scientific data for the serious research worker, but it also is helpful in solving production problems that are occurring every day in almost every shop and factory. Whenever ultraslow motion pictures are used, not only is the original problem answered, but, in many cases, other factors are indicated or proven which were never suspected or considered at the time. Somewhere on the screen, adjacent to the principal points of study, something else is taking place, and its indication in slow motion proves to be of real value in itself.

In the application of the ultra high speed camera to scientific research, the correct method of intrepreting the film is of the utmost importance. High speed pictures can be studied under standard projection speed as a slow motion picture in any standard 16 mm. projector. Where original photography has been executed at 3,200 frames per second, these pictures may be viewed at a speed 200 times slower than normal, when projected at 16 fps. Slower taking speeds reduce the proportion, but even at the slowest speed possible with this equipment—900 fps—extreme slow motion is evident on projection and is most helpful in analytical work. These same pictures may be studied frame by frame with a suitable magnifying glass or low power microscope. In work with grass fracture, explosions, bullet impact, and other subjects of extreme high original speeds, this method of study is perhaps the best for providing the required data. Projecting films in reverse provides another means of study, in which many originating movements and actions can be traced. In forward projection, phenomena of this type are often missed entirely.

The technique of camera operation involves so many conditions not encountered in usual photographic work, either motion or still, that personal experience by the operator is of prime importance. Then, too, each subject becomes a study within itself calling for not only photographic ability, but technical ingenuity as well.

Our organization has taken hundreds of thousands of feet of ultra-speed film under widely varying conditions and has the experience and equipment necessary to meet almost any requirement.

Getting sufficient light onto the subject is the source of greatest concern. Even when taken out-of-doors in brilliant sunlight, additional spot and flood lights are required. In some instances, it is necessary to photograph action in silhouette, the lights being behind a moving subject and shining directly into the camera.

When a precise point of intermit-

tent or impact action must be photographed at this high speed, synchronization between the subject and film exposure becomes an all-important factor. Allowance for motor acceleration must be carefully calculated in reference to the moment of action wanted, remembering that, running at 3,200 fps, only one and a quarter seconds are available to catch the action.

A special synchronizing mechanism has been developed by our organization which largely eliminates the fallibility of the human element. Without this mechanism many rolls of film could be used without once catching the desired action. This is particularly true of glass fracture, *where the instance of primary fracture has frequently taken place between exposures* —even when taken at 3,200 frames a second.

Taking pictures of action within closed areas, such as valve action, fuel injection, and explosions within compression cylinders, presents a problem of introducing not only transparent parts for the camera, but means of intense interior lighting as well. Before the preparation of special equipment for such studies is started, the research department would do well to consult the photographer. Such a procedure takes advantage of past experiences and reduces the element of chance or possible failure in obtaining the expected result.

Where the ordinary motion picture camera has a minimum objective field of one and a quarter by one inch, the ultra high speed camera can be focused to a minimum field one-quarter inch square. This permits concentration upon very minute subjects of specific importance. When shown on the screen, the action represents submicroscopic enlargement of many diameters.

Many cases require accurate measurements of time and space. While provision can be made within the camera for a clocking system capable of recording extremely small intervals of time on the edge of the film, the cost of installation is almost prohibitive, and the system is both bulky and unwieldy. It is possible, however, to provide an accurate time record on the film by inserting in the picture field a stroboscopic light source of known frequency. From the photographic image of this series of light flashes, exact time measurement may be made even to the small interval between two consecutive frames. The image of the flashes may be positioned in the frame at will, and do not interfere in any way with the subject under study.

In measuring space, each project requires the application of a specific method. None are especially difficult to apply and all provide the research worker with adequate and exact figures from which he may make precise readings and prepare accurate charts and graphs. Some cases require the calibration of moving parts against a stationary scale introduced for the purpose. In most cases, however, it is only necessary to insert a suitable scale in the field of photography and in the plane of the subject. Completely detached from all moving parts, it has no effect on them at all, and does not introduce any errors. Upon projection to an enlarged picture, using a sheet of paper as a screen, the scaled divisions may be ruled off the paper in both vertical and horizontal lines. Projected action of the subject upon this screen can be calibrated readily against the graph and provide all the measurements which may be desired.

Pictures which must show what takes place in the center of a machine and at the same time include something else going on at either side or at a remote part of the machine, really tax the ingenuity of the operator. Skillful use of mirrors, prisms, relays and electronic indicators all help and usually provide the desired data accurately integrated into a single frame. Studies of this type naturally require much time in preparation, and an entire day can be spent in getting everything ready for one or two shots that take only a few seconds to make.

Occasionally it is desirable to produce ultra high speed photography in color. This is not especially difficult where the subject itself is sufficiently self-luminous. Kodachrome is very slow in its emulsion speed and the light emitted by a subject must of necessity be very intense. The electric arc is one of these, and provides excellent studies in natural color. Where a subject is not selfluminous, it is necessary to provide an *immense* amount of incandescent light of correct spectral balance to assure satisfactory register on the film. Providing such an amount of light requires the construction of a complex piece of apparatus capable of flashing 150 flash bulbs in rapid succession. Operational cost of this procedure is very high and is recommended only when color is of paramount importance.

In addition to the field of pure research, the following are two highly important uses for ultra-speed photography which some manufacturers have been quick to appreciate and apply:

One, the educational advantages to be attained by incorporating ultra speed with normal speed photography in visual-training films. The operation of high speed tools and the intricacies of peculiar fabrication techniques can be more readily explained and comprehended when brought down to ultra slow-motion studies.

Two, in sales promotion and institutional films, where the selling points of fast-operating features may be brought down to comprehensible speeds.

The applications of high speed photography to the study of motion and motion-effects are as limitless as the applications and uses of motion itself.

An accounting of results obtained through the use of ultra speed photography would be of tremendous interest but, like all phases of research, both in war and peace, secrecy is paramount. Until such time as those for whom fiims were made, see fit to publicize the results, they must remain concealed. However, the circumstances surrounding those problems contain more than a little interest and can direct thought to further applications.

A few subjects in which the ultra high speed camera has furnished the industrial research engineer with important factual data are:

Causes of failures in packaging, envelope, and folding machines

Causes of variations in mechanical pickup of sheets of paper from a pile

Excessive stress in moving parts

Improper timing of valve action

Cause of vibration in motors

Studies of air and liquid flow

Study of clearances between moving parts.

◆

Dry-Indicator Test for Water Resistance of Papers

In applying this test, which is a TAPPI Standard Method, T 433m, to papers that are highly water resistant, such as asphalted papers, difficulty has been experienced by some operators in judging the proper end point because of the slow change of the color of the indicator. The National Bureau of Standards, which originated the method, offers the following suggestions with respect to this difficulty.

The instruction that the indicator powder be sprinkled on the test specimen in a "thin, uniform" layer is sometimes neglected. The powder should be sprinkled over the sample as evenly as possible, avoiding either a very sparse covering or one in which the powder is piled up. In the former case, the color change produced by too few dye particles may be insufficient to attract attention, unless they are exposed for a longer time than the proper end point. When the powder is placed on too thickly, the upper layer may obscure changes in that in contact with the paper. Also, the

(Concluded on page 466)

Slidefilm Effectiveness Test

LYNE S. METCALFE

▶▶▶ INTEREST IN VISUAL education and training within industry has increased steadily as a result of the widespread use of films of all types in the war training programs, in the Armed Services, and in industry itself.

As a rule, pencil and paper tests, and visual learning are measured solely by verbal response. But in skills and vocations, training of the kind required in the various phases of the paper industry, the verbal statement of a set of conditions given in an examination question might not present the problem concretely to the student. Some learners can master a problem or fact from visual instruction and then demonstrate their mastery on a machine or with objective materials, yet they may lack the ability to prove their understanding by writing about it.

Recently some interesting studies were made during a visual training clinic conducted at The Jam Handy Eye School, Detroit, to determine a simple method by which any personnel department or instructor may test out the efficacy of the slidefilms being used. This method was developed in co-operation with the Coast Guard which makes important use of visual training.

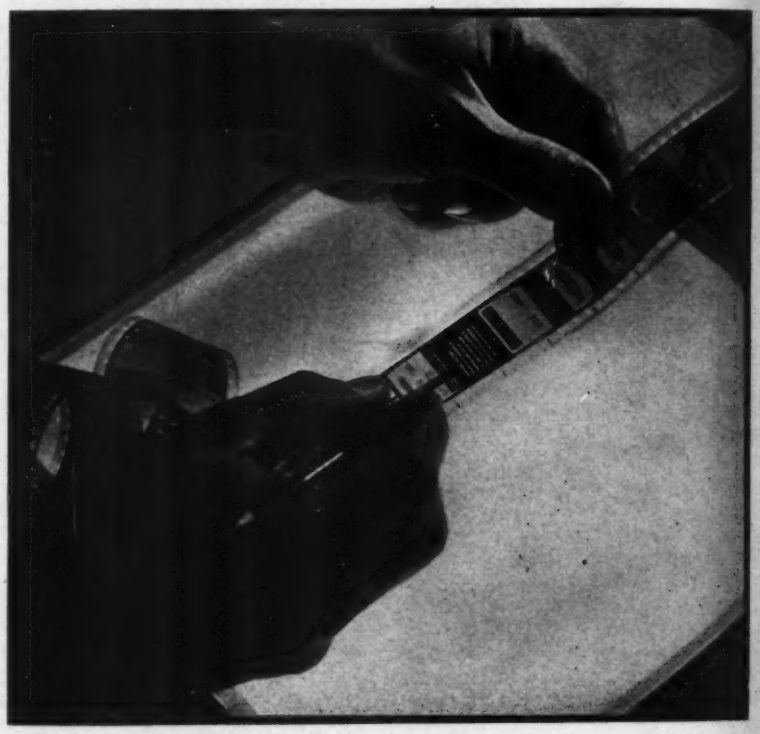
Any teaching film may be used in this test, recreating the situation as it was learned. Portions of the picture and words, phrases, or complete sentences are *blacked out*. When it is then shown to the employee class, each learner is confronted with the problem of supplying the missing pictures, words, constructions or other factors which the instructor has blacked out. This is, in effect, a completion test on both visual and verbal presentations of information.

The same slidefilm is used for testing and teaching. To prepare the test, the instructor makes a paste of lampblack and water, and applies it to the *glossy* side of the film with a small art brush. The portions which are to be omitted in making the test are covered with the paste and, therefore, will not appear on the screen when the film is projected.

After the test, the lampblack can be removed easily with a slightly dampened cloth or merely by rubbing the thumb across the film. The instructor consistently using slidefilms may black out his films over a plate of glass illuminated from below, opaquing the portions to be eliminated in the test easily and quickly. A mimeoscope provides just the right illumination, or a light bulb placed in a shallow box with a frosted glass top will serve the same purpose.

In checking test papers, the instructor or the class may review the complete slidefilm—frame by frame—with the correct answers, or the papers can be checked in the usual manner with a key prepared from the film.

Evaluation including testing is now a very definite phase of teaching in the Coast Guard. This particular refinement of testing in which the emphasis is placed on the objective, visual factors in learning, presents questions and problems clearly. Because the student need not ponder the meaning of the question itself, he can concentrate on the answer to the question or the solution of the problem.



Dry-Indicator Test

(Continued from page 465)

greater total quantity of powder may require more time to change since it would necessitate more moisture to affect all the dye. The test specimen should be handled with care once the powder is applied, for jarring or excessive tipping may cause rearrangement of the particles of powder, which then tend to ball up or form in clusters.

Artificial light, when used for viewing the test specimen, should be reasonably brilliant but completely shaded from the eyes. The light should be applied to one side of the specimen (thus avoiding reflection from the cover glass), and the eye should view from the side next to the illuminant, to avoid interference of shadows cast by the indicator particles with the judgment of the color.

The powder as it is first sprinkled on the test area often shows a slight tinge of color other than the predominant white. This first color may appear slightly different on surfaces of different color. After the test has been in progress for such a time that the end point is reached, a more intense color is present and is a somewhat reddish purple. Finally, if the sample is left for a longer time than the proper end point, the reddish cast tends to disappear and the powder appears a dark purple; also, the particles often appear as if quite moist. Sometimes as the specimens are unevenly resistant there may be hints of two or possibly all three phases at once, but it should be easily ascertainable which is predominant. In any case, taking the first hint of change from the white should be avoided; enough change should be allowed to take place to be positive. On the other hand, one should not wait for the last purple phase for once this is attained there is little further change to note.

Power Saws for Cutting Pulpwood

▸▸▸ PULPWOOD CUTTING operations in the South are carried on throughout the year. This practice makes it unnecessary for the mills of the region to maintain large quantities of pulpwood in storage in mill yards. Ordinarily, this supply would never exceed individual mill requirements for more than two to three months.

To maintain such a small reserve supply at the mills requires careful coordination of pulpwood production operations with the transportation of pulpwood to the mills and with actual mill requirements. In normal times, this co-ordination is comparatively easy to effect. However, with the manpower shortage resulting from the War, a serious shortage of pulpwood cutters developed. This shortage of manpower soon was felt by most, if not all, of the mills in the South. Some of the mills were forced to shut down temporarily because of no wood. Other mills saw their storage piles reduced almost to the vanishing point but continued operations on a hand-to-mouth basis.

To alleviate this critical situation—not being able to recruit the necessary pulpwood cutters for the work—the time-honored custom of tree felling and bucking of the logs into pulpwood lengths was supplemented by the use of power-driven equipment for both of these operations. The relatively open forest stands and the comparatively flat terrain of the region made it possible in numerous instances to use this equipment to advantage.

No doubt the power saw has much wider application in the cutting of pulpwood than has as yet been developed. Apparently introduced into the industry to meet an emergency, it has proved its practicality for certain logging operations and just naturally will find a growing acceptance by pulpwood operators.

◆

Read from top to bottom:

1 and 2—Lowther power-driven circular saw being used for felling trees and for cutting pulpwood. Design of unit permits saw to be adjusted to cut either horizontally or vertically as shown.

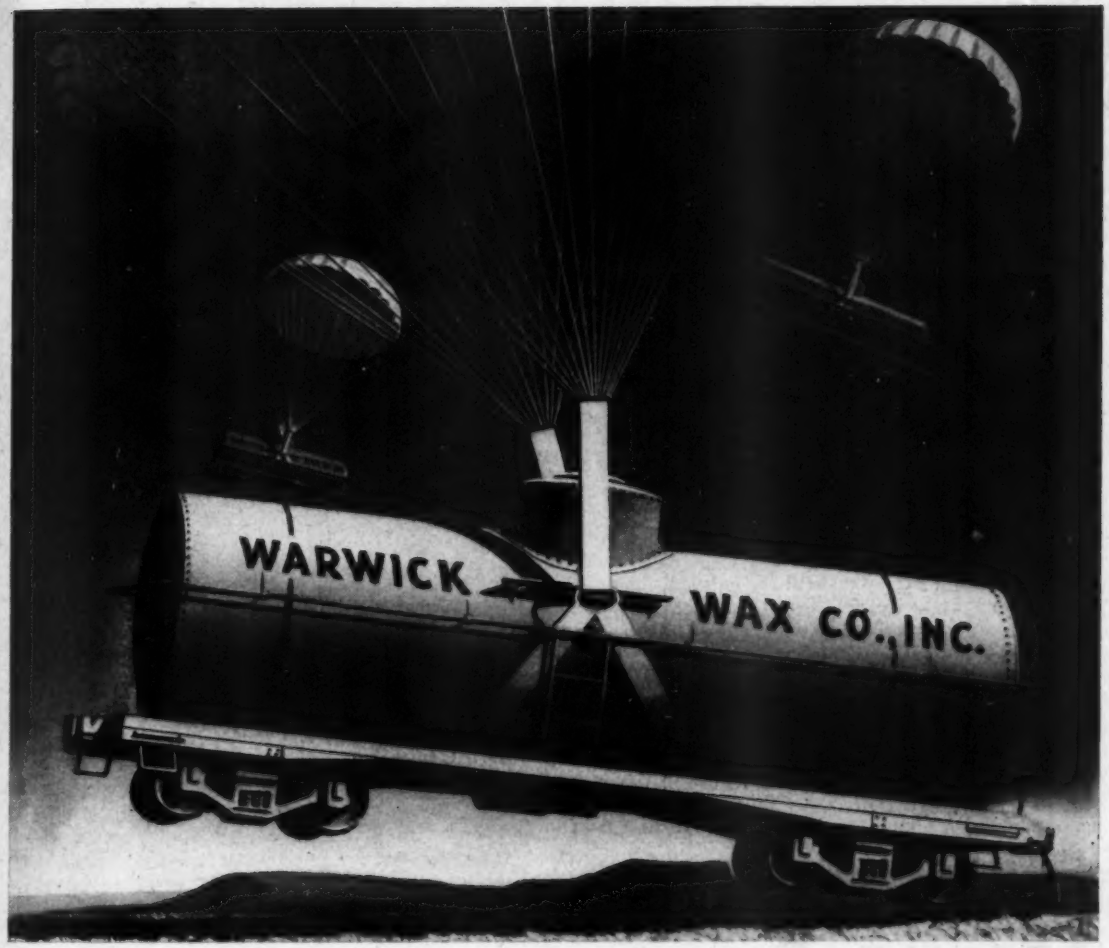
3 and 4—Dission portable chain saw being utilized for the same purposes as the circular saw in 1 and 2.

5—Portable circular cut-off saw equipment for pulpwood cutting. Designed by the staff of International Paper Company.

(All photos courtesy of the International Paper Company.)

PAPER SKETCHES

IN MID-19th CENTURY RURAL BRITTANY (FRANCE) RAGS FOR PAPER-MAKING WERE GATHERED BY NOMADIC, GYPSY-LIKE MERCHANTS, CALLED "PILLAVERS," WHO SANG OUT, "PILLAVER! PILLAVER!" AS THEY APPROACHED EACH FARM HOUSE. THESE PILLAVERS WERE SOCIAL OUTCASTS, LIVING IN CAVES. . . . .
MEDIAEVAL CHINESE PAPERMAKERS DRIED SHEETS OF PAPER ON THE WALLS OF GLAZED TILE STOVES.
THE MEDIAEVAL ARABS MADE PAPER FROM HEMP SALVAGED FROM ROPES, TOWELS AND CLOTHING.
THE CURRENT WEEKLY FLOW OF SALVAGEABLE WASTE PAPER THROUGH THE NATION'S HOUSEHOLDS AMOUNTS TO 1.39 POUNDS PER PERSON. OF THIS TOTAL, NEWSPAPERS ACCOUNT FOR 0.80 LB; MAGAZINES, ETC., FOR 0.24 LB; WRAPPING PAPER FOR 0.19 LB; AND OTHER WASTE PAPER FOR 0.16 LB.



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ASSOCIATIONS

RAY BARTON APPROVES CHEMICAL GROUP TASK COMMITTEE PERSONAL

A new committee of the American Pulp and Paper Mill Superintendents Association is known as the Chemical Group Task Committee. The representatives of this committee were selected by Past President Stanford Blankinship and Norman O. Weil, chairman of the Industrial Affiliates Committee. The appointments have been approved by Raymond L. Barton, who was elected national president of the Superintendents Association at its annual meeting in Chicago, May 24-26.

President Barton will be chairman of this committee and Mr. Weil will be co-chairman. Co-secretaries are George W. Craigie, national secretary-treasurer of the Association, and John Cornell, co-publisher of *Paper Mill News*. In addition, the committee is made up of fifty-six members: twenty-eight from the Superintendents Association and a like number from its Industrial Affiliates.

The committee is now at work collecting information for the preparation of a booklet on "Practical Application of Chemicals in the Manufacture of Pulp and Paper." The committee met for the first time March 29 in New York. Another meeting in New York took place April 25, and the third meeting was in Chicago May 23.

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PRO PAPER GROUP CLOSES SEASON WITH THREE-ACT PLAY

The Chicago Professional Paper Group closed its meeting of the first season on the evening of June 5, 1944, by presenting a three-act play entitled "Paper Lingo." This play showed the paper technologist in action and revealed just as indicated by its title the meaning of a large number of pulp and papermaking terms.

Act 1 covered a situation in the office of a paper mill superintendent when a visitor returned to the office after a trip through the mill.

The second act was in the office of a technical director. In this case Mr. I. Getaround, a field representative of the same firm as the technical director, learned quite a bit about the wartime activities of a technical department.

The last act was in the office of a paper merchant. Here a dialogue took place between the paper merchant and two customers; one an industrial purchasing agent and user of ordnance papers; the other, a printer's assistant and user of fine papers.

The cast, in order of appearance, was as follows:

Paper Mill Superintendent . . . . . A. E. Montgomery
Visitor . . . A. W. Neubauer
Technical Director . H. R. Alley
Mr. I. Getaround . . . . . V. V. Vallandigham
Paper Merchant . . . . . Arnold McAneny
Industrial Purchasing Agent . . . . . Wayne Watts
Printer's Assistant . . . . . Harold Johnson

Mr. Montgomery is with the J. O. Ross Engineering Corporation; Mr. Neubauer with the Glidden Company; Mr. Alley with Tested Papers of America, Inc.; Mr. Vallandigham with Kelco Company; Mr. McAneny, Mr. Watts and Mr. Johnson, with Bradner Smith & Company all of Chicago.

The play was produced under the supervision of the Program Committee and proved quite a novel means of presenting technological information.

The meeting was attended by well over 100 people and was held at the Chicago Bar Association, 29 South La Salle Street.

Special entertainment was provided by Joe Wallace, well-known entertainer, and in this case, the sponsors were: The Arabol Manufacturing Company; Hart & Harrington, Inc.; Manhattan Paste & Glue Co., Inc.; National Adhesive Div., National Starch Products, Inc.; and Paisley Products, Inc.

Before the meeting was closed, President H. R. Alley announced that the next meeting would be held on the evening of October 16.

◆

▶▶▶ INDICATIONS ARE that nearly every manufacturing process involving chemistry in some way will influence the selection of speakers for the National Industrial Chemical Conference, which will be a feature of the Third National Chemical Exposition to be held at the Chicago Coliseum November 15 to 19. The conference and show are sponsored by the Chicago Section of the American Chemical Society. The show has established headquarters at 330 South Wells Street, Chicago 6.

◆

CONVENTIONS AND COMING EVENTS

September 14-16—Fall meeting of the Northeastern Division of the American Pulp and Paper Mill Superintendents Association at Poland Springs House, Poland Springs, Maine.

October 3-5—33rd National Safety Congress and Exposition at the Sherman, Morrison and La Salle Hotels, Chicago.

November 15-19—National Chemical Exposition at the Coliseum, Chicago.

STATED MEETINGS

Technical Associations of the Pulp and Paper Industry.

Delaware Valley Section—First Friday of each month at the Engineers' Club, Philadelphia, Pa.

Kalamazoo Valley Section—First Thursday of each month, including June, at 6:30 P. M. at the Columbia Hotel, Kalamazoo, Mich.

Lake States Section—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

New England Section—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

Chicago Professional Paper Group

First Monday of each month except July and August, at Chicago.

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SOLVAY*

...KEYED TO TODAY AND TOMORROW

Today...Solvay's large facilities are supplying alkalies which are used in the over-all requirements for the mass production of pre-fabricated war housing. In the history-making months to come, Solvay will continue to make its important contributions to the war with highest quality alkalies and related products.

Tomorrow...New housing methods will offer a healthy, more enjoyable way of life to people everywhere. Solvay, with its broad background of long experience and continuous research, will keep in step with all new housing developments—supplying quality alkalies to America's great industries.

SOLVAY

The Solvay Process Company employs salt, limestone and ammonia to make Soda Ash, from which basic material Caustic Soda and other alkalies are derived.

SODA ASH
AMMONIUM BICARBONATE
AMMONIUM CHLORIDE
PARA-DICHLOROBENZENE
CAUSTIC POTASH

CHLORINE

CAUSTIC SODA
POTASSIUM CARBONATE
SODIUM NITRITE • SALT
CALCIUM CHLORIDE
MODIFIED SODAS

SOLVAY SALES CORPORATION
Alkalies and Chemical Products Manufactured by The Solvay Process Company
40 RECTOR STREET NEW YORK 6, N. Y.

COME TO THE PLANT THAT SPECIALIZES ON THEM... *and nothing else*

The Harper organization devotes its energies and facilities exclusively to non-ferrous and stainless fastenings. It manufactures bolts, nuts, screws, washers, rivets and specials of Brass, Bronze, Copper, Everdur, Monel Metal and Stainless Steel. It produces nothing in common steel or iron.

Harper offers large and widely assorted stocks . . . extensive manufacturing facilities . . . engineering "know-how" . . . and field service difficult to match elsewhere. All of which means much to the fastening user.

New four color, one hundred four page catalog and reference book ready soon.

THE H. M. HARPER COMPANY
2647 Fletcher Street • Chicago 18, Illinois
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HARPER
EVERLASTING FASTENINGS
BRASS • BRONZE • COPPER • EVERDUR
MONEL • STAINLESS

ALLIED

CALCO ANNOUNCES NEW PIGMENT DEPARTMENT

A newly formed Pigment Department was made effective July 1 by the Calco Division of the American Cyanamid Company, Bound Brook, New Jersey.

This department, under the management of John Allegaert, will handle all products formerly sold by Calco and United Color and Pigment Department to the pigment-consuming industries. Included will be Unitane (titanium dioxide) and other products of the Virginia Chemical Corporation, whose manufacturing facilities have just been acquired by Calco.

Sam Klein, who recently was appointed Western Sales Manager for Calco, also will handle sales for the Pigment Department in that territory.

◆

▶▶▶ OUR INVASION FORCES will be protected against blistering gases, should the enemy make gas attacks, by wearing a garment of cellophane. The Chemical Warfare Service chose a special type of cellophane for this use because it proved to be more impermeable to poisonous gases than any other lightweight transparent material. The garments are expendable and can be thrown away after use. This will explain why cigarettes and many other packages are minus their glossy attractive covering.

◆

G. D. JENSSEN CO. NOW INCORPORATED

Announcement has just been made of the incorporation of the G. D. Jenssen Company, New York City. A New York State charter was granted on May 17. The new corporation, headed by J. D. Jenssen, president, will continue to carry on the business of the G. D. Jenssen Company, long identified with the pulp and paper industry as builders of the Jenssen acid system.

Mr. Jenssen, the president, has been active in the service of the sulphate pulp and paper industry since he first came to this country in 1901 from Norway. He was associated, consecutively, with J. H. Wallace, New York, and H. S. Ferguson, Millinocket, Maine—both consulting engineers—until 1905 when he returned to Europe. He served as engineer for several large companies abroad until 1909, when he returned from Europe and assumed activities with Riordon Co., Ltd., at Hawkesbury, Ontario. In 1916, Mr. Jenssen joined with his brother, G. D. Jenssen, and since that time the activities of the organization have been carried on under the name of G. D. Jenssen Company.

At the present time, there are 89 Jenssen tower installations actively operating sulphite mills on this continent, as well as a large number in European pulp producing countries.

G. D. Jenssen Co., Inc., is planning an expansion of activity and will offer improved acid plants and other process developments as a current and postwar program.

◆

▶▶▶ THE TITANIUM DIOXIDE manufacturing facilities of the Virginia Chemical Corporation, Piney River, Virginia, was acquired from the Interchemical Corporation on July 1 by the Calco Chemical Division, American Cyanamid Company. This organization, formerly a part of the United Color and Pigment-Interchemical setup, now becomes a unit of the Pigment Department of the Calco Chemical Division. J. Allegaert is manager, and A. B. Hettrick is resident manager of the Virginia operation.

◆

NEW DEPARTMENT IS FORMED AT WYANDOTTE

The formation of a new department, known as the new Development Department, has been announced by Wyandotte Chemicals Corporation, Wyandotte, Michigan. This department will handle a research program, first started about five years ago, for the development of both organic and inorganic products.

The work of this new department will be in charge of J. J. Schaefer, who comes to Wyandotte from the Sharples Chemicals Incorporated, where he served as vice president since 1936. He is a member of the American Chemical Society, the American Institute of Chemical Engineers, and the Chemists Club of New York.

◆

▶▶▶ THE FIRST ISSUE OF a new house magazine now being published by Yarnell-Waring Company, Philadelphia, has been received. It is called *Yarway News*, and will be issued quarterly. This new publication contains some very interesting well illustrated material, and the cover carries an unusual illustration of one of the world's largest steam-electric generators at Philadelphia Electric's Richmond Station.

◆

HYDRAPULPER PATENT INFRINGEMENT CLAIMED

It is claimed by the Cowles Company, of Cayuga, New York, and the Black-Clawson Company, of Hamilton, Ohio, that the San-Nap-Pak Manufacturing Company, New York City, is guilty of infringement of the Cowles patent (U. S. Pat. 2351492).

The alleged infringement makes the charge that San-Nap-Pak Manufacturing Company designed, built, and installed in its Wilmington, Delaware plant a pulper in direct violation of claims contained in the above patent. The complainants seek full patent protection for the hydrapulper which has been proved to be revolutionary in the method of reducing pulp and paper to slush form.

Wyandotte Research, Development, and Sales Executives Inspect Organic Pilot Plant. Left to right: Dr. W. F. Waldeck and Dr. Thomas Vaughn, of the Research Department; J. J. Schaefer, director of development and Lawrence D. Linke, his assistant; Howard F. Roderick, director of research, and Bert Cremers, vice president in charge of sales, Michigan Alkali Division of Wyandotte Chemicals Corporation.

ARMY-NAVY "E" AWARDS

Aurora Pump Company, Aurora, Illinois—For having established a splendid record of accomplishment in its production of pumping equipment, this company was awarded the "E" pennant on June 26. Presentation ceremonies were held at the company plant and the award was made by Captain Robert Henderson, U.S.N., of the Office of the Chief of Naval Operations, Washington, D. C. Frank S. Main, company president, accepted the award. "E" pins were presented to the employees by Lt. Colonel Royal H. Place, executive officer, District No. 3, 6th Service Command, Chicago.

Kimberly-Clark Corporation, Neenah, Wisconsin—Wall paper was formerly made at this plant, but for some months past it has been making the mounts for the M-45 antiaircraft guns. For the "excellence" of its production, it has been awarded the Army-Navy "E" pennant. (See page 430).

Mathieson Alkali Works, Saltville, Virginia—For high achievement in the production of war materials, this plant received the Army-Navy "E" award on June 19. The presentation was made by Col. Frederick C. Horner, chief Highways Division, Transportation Corps, Washington, D. C., and accepted by George W. Dolan, president of the Mathieson organization.

United States Rubber Company, Hogansville, Georgia — This plant, where yarn is spun for bullet-sealing hose was awarded the Army-Navy "E" pennant on June 20, with ceremonies held on the plant grounds. The award was presented by Col. Francis J. Heraty, assistant director of Officer Candidate School, Fort Benning, representing Under-Secretary of War Robert P. Patterson. A. C. Link, factory manager of the plant received the pennant. Representing the Navy was Commander William Waldron White, commanding Atlanta Naval Air Base.

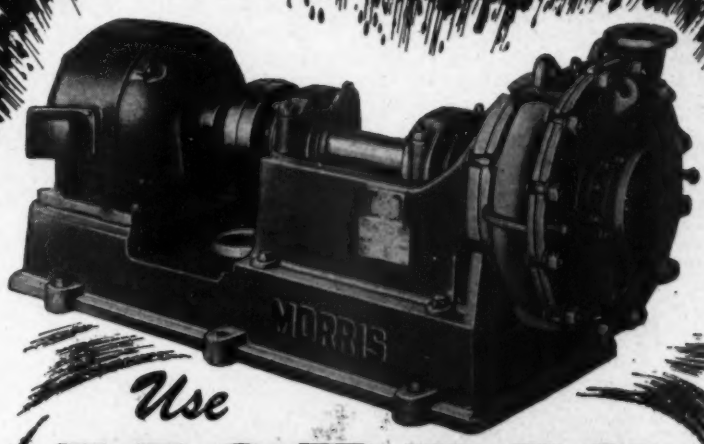
"E" Renewals

Second Star: Clark Tructractor Division of Clark Equipment Company, Battle Creek, Michigan. . . . Improved Paper Machinery Corporation, Nashua, New Hampshire. . . . Whiting Corporation, Harvey, Illinois.

Third Star: H. M. Harper Company, Chicago.

Fourth Star: The Falk Corporation, Milwaukee, Wisconsin.

Cut Power, Labor & Maintenance Costs on Pumping Caustic Liquors or Slurries



Use

MORRIS

TYPE S

SLURRY PUMPS

Morris Slurry Pumps are making remarkable records for efficiency, long wear and low cost in chemical and industrial plants. They have been especially successful in paper mill caustic recovery, and in handling alumina slurries. Foaming cryolites—a highly corrosive and abrasive mixture of the double fluorides—have been handled for months without excessive wear or serious loss of efficiency.

That's because the running parts are simple and rugged, designed to handle slurries of high specific gravities at high heads, Suctions of large diameter and impellers with easy entrance curves permit flow of thick mixtures without choking or excessive friction. The important patented feature of Morris hydraulic design—the *pressure balanced impeller* providing minimum turbulence of flow and maximum efficiency—contributes to the long life of the wearing parts.

Be sure you have the right pump design to suit the specific gravities, particle size and density of solids in the slurries you have to handle. Get all the facts. Write now for Morris bulletin No. 173, containing performance tables, specification requirements and other data.

MORRIS MACHINE WORKS
Baldwinsville, N. Y.

MORRIS
CENTRIFUGAL PUMPS

SAFETY

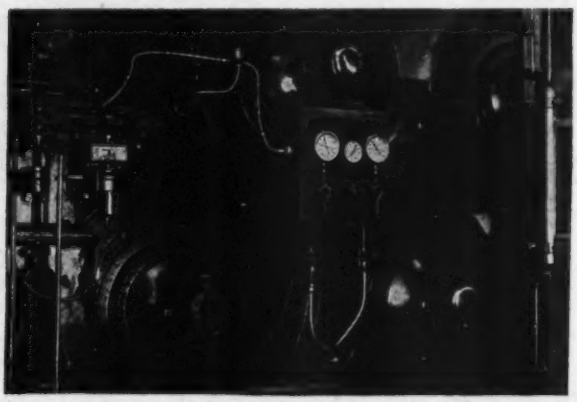
ACCIDENTS IN WOODS OPERATIONS DOWN FOR PROVINCE OF QUEBEC

The cost of accidents to men working in Quebec forests has fallen since 1936 from $7.04 to $2.72 per $100 of wages. This interesting fact was a highlight of an address given by Elliott M. Little, general manager of Anglo-Canadian Pulp and Paper Mills, Ltd., Quebec, before the twelfth annual convention of the Quebec Pulp and Papermakers' Safety Association held in June.

Mr. Elliott also said that the province of Quebec now has the best woods experience rate in all Canada, and that the accident reduction in woods operations had resulted in saving over $1,000,000 a year in the cost of woods accidents as compared to the experience seven years ago. Accident costs in 1943 on pulpwood operations were approximately one-third of the experience in 1936.

STICKLE DRAINAGE AND CONTROL

EXTREMELY CLOSE MOISTURE CONTROL



Simple in construction. No delicate mechanism to get out of order.

• Stickle control of moisture content is both accurate and dependable. Performance of Stickle Tension and Thermal Control is so positive that it can be installed on a guarantee of control within a variation of one-half of one per cent. Authenticated tests made in various plants often show the variation to be within closer limits. Tests made on 4.8 Bleach Gray Linen Condenser Paper being run on a machine equipped with Stickle Tension and Thermal Control indicated a moisture variation of only one-fourth of one per cent.

Stickle Tension and Thermal Control supplies positive uniformity of moisture content. After the desired moisture content is established, production may be continued at that point with little manual attention.

Close control of moisture with stabilization of steam flow supplied by Stickle Equipment eliminates cockling, reduces curling and shrinkage and, to a very great degree, prevents dryer snap-offs. Results: Increased production efficiency, improved quality and decreased costs.

Stickle

STEAM SPECIALTIES COMPANY

2225 VALLEY AVENUE • INDIANAPOLIS, INDIANA

FOR 40 YEARS REDUCING STEAM COSTS IN PAPER MILLS

ECUSTA CORP. WINS NAT'L SECURITY AWARD

With special ceremonies at Camp Sapphire, July 4, the Ecusta Paper Corporation, Pisgah Forest, North Carolina, was awarded the National Security Award. The presentation address was made by Governor J. M. Broughton.

The Office of Civilian Defense instituted this recognition award October 1, 1943. The award honors plants for providing the safeguards to production. It is not limited to plants eligible for the Army-Navy "E" and other similar citations; it may be given to any plant listed as producing essential facilities.

Ecusta was chosen to receive the award for maintenance of a superior standard of plant protection and wartime achievement.

◆

SAFETY SCORES

▶▶▶ IN THE ANNUAL Paper Industry Safety Contest which began July 1, 1943, reports received for May show eight mills maintaining a perfect record. These mills are:

Division I—Pulp and Paper Mills

Groups A and B—(none)

Group C—

Strathmore Paper Co. (Woronoco Mills), West Springfield, Mass.

Group D—

Marathon Paper Mills Co., Rothschild, Wis.

Spaulding Fibre Co., Inc., North Rochester, N. H.

International Paper Co., Riley, Me.

Division II—Paper and Board Remanufacturing

Thilmany Pulp & Paper Co. (Bag Mill), Kaukauna, Wis.

South West Box Co., Sand Springs, Okla.

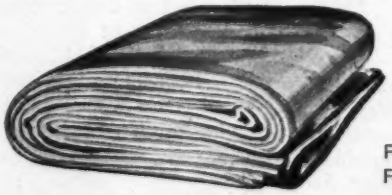
Bay West Paper Co., Green Bay, Wis.

The paper industry safety contest is conducted among member mills of the Paper and Pulp Section of the National Safety Council, and runs for twelve months. The present contest covers the period July 1, 1943, to June 30, 1944.

"ALL ABOARD for the LIMITED"

The "Limited" makes the run from New York to Chicago in 17 hours, with only 3 station stops on the way. The "Fast Mail" makes the same run in 25 hours, with 24 station stops *en route*. The actual *running* time of both trains is about the same. Stops and starts account for the 8 hours lost by the "Fast Mail."

Substitute tonnage for mileage and you will have a true yardstick for measuring the relative production of two paper machines. The machine that is equipped with a Hamilton Felt can be run at top speed because every Hamilton Felt removes water very fast, thereby reducing the time required at the drier rolls. Equally important, every Hamilton Felt is completely and evenly shrunk before it goes into service. Consequently Hamilton Felts ride the rolls as smoothly as the "Limited" rides the rails — without frequent stops for adjustment.



From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

Miami Woolen Mills

Hamilton Felts

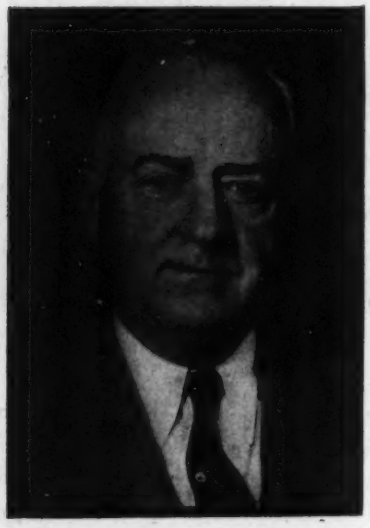
Established 1858

NAMES *in the* NEWS

Personals

HONORARY DEGREE CONFERRED UPON L. W. SUTHERLAND

At the annual commencement of Kalamazoo College on June 12, Louis W. Sutherland, mayor of Kalamazoo, Michigan, and chairman of the board of the Sutherland Paper Company, received the honorary degree of Doctor of Laws.



L. W. Sutherland

This honor was conferred in recognition of his worth as a leading citizen of his community, a cultured gentleman of great humanitarian interests, and a successful business man in local and national affairs.

◆

▶▶▶ A new appointment has just been announced by Hammermill Paper Company, Erie, Pennsylvania. *John H. DeVitt,* with 22 years of service in the employ of the company, has been promoted to comptroller, a recently created position at the Erie, Pennsylvania, plant. He is president of the National Association of Cost Accountants.

◆

▶▶▶ The board of directors of Hammermill Paper Company, Erie, Pennsylvania, held a meeting recently and re-elected *Norman W. Wilson* as president. Other officers elected at the meeting were: *O. F. Behrend,* treasurer; *Donald S. Leslie,* first vice president and general manager; *W. T. Brust,* vice president and assistant treasurer; *H. R. Baldwin,* vice president in charge of sales; *M. Harrison,* vice president in charge of industrial relations; *Richard P. Price,* vice president and general superintendent; *W. F. Bromley,* secretary; and *F. P. Klund* and *A. E. Frampton,* assistant secretaries.

◆

▶▶▶ At a recent annual meeting, the directors of E. D. Jones & Sons, Pittsfield, Massachusetts, elected *Henry H. Williams* as vice president in charge of sales, and *Dwight E. Jones,* vice president in charge of engineering and manufacturing. The appointments, the company reports, were made in recognition of the notable contributions made by these officers to the progress of the company before and during the war periods.

◆

CANADIAN FORESTRY COMMANDER, WHITE MADE MAJOR-GENERAL

Brigadier-General John B. White, of Montreal, commander of the Canadian Forestry Corps, has been promoted to the rank of Major-General and will be retired shortly from the Canadian active force after a long career. Major-General White, who was called on by Defense Minister Ralston in 1940 to form the first Canadian Forestry Corps, was returned to Canada as a casualty last September.

Widely known throughout Canada through his business, as well as his military activities, Major-General White was a former vice president and director of Canadian International Paper Company, and a former president of the Canadian Forest Industries Association. The general, who celebrated his 70th birthday last January, organized the Forestry Corps, trained and took it overseas.

◆

▶▶▶ After serving as technical superintendent at Bowater's Corner Brook, Newfoundland mills, since 1929, *W. S. Cramp* has resigned to join the Lake St. John Paper Company at Dolbeau, Quebec. Before going to Newfoundland, Mr. Cramp was employed as a chemist in the Salt Division of Canadian Industries, Limited.

J. A. ROSMAIT IS NOW WITH D. J. MURRAY CO.

Associated with the paper industry since 1920, and for the past two years engaged on the design of specialized heavy war production machines, J. A Rosmait became associated with D. J. Murray Manufacturing Company, Wausau, Wisconsin, on June 1.

Mr. Rosmait came to the paper industry as hydraulic engineer for one of the leading paper manufacturers in Wisconsin. He had had a wide experience previously as an engineer. When he first came into the paper industry

J. A. Rosmait

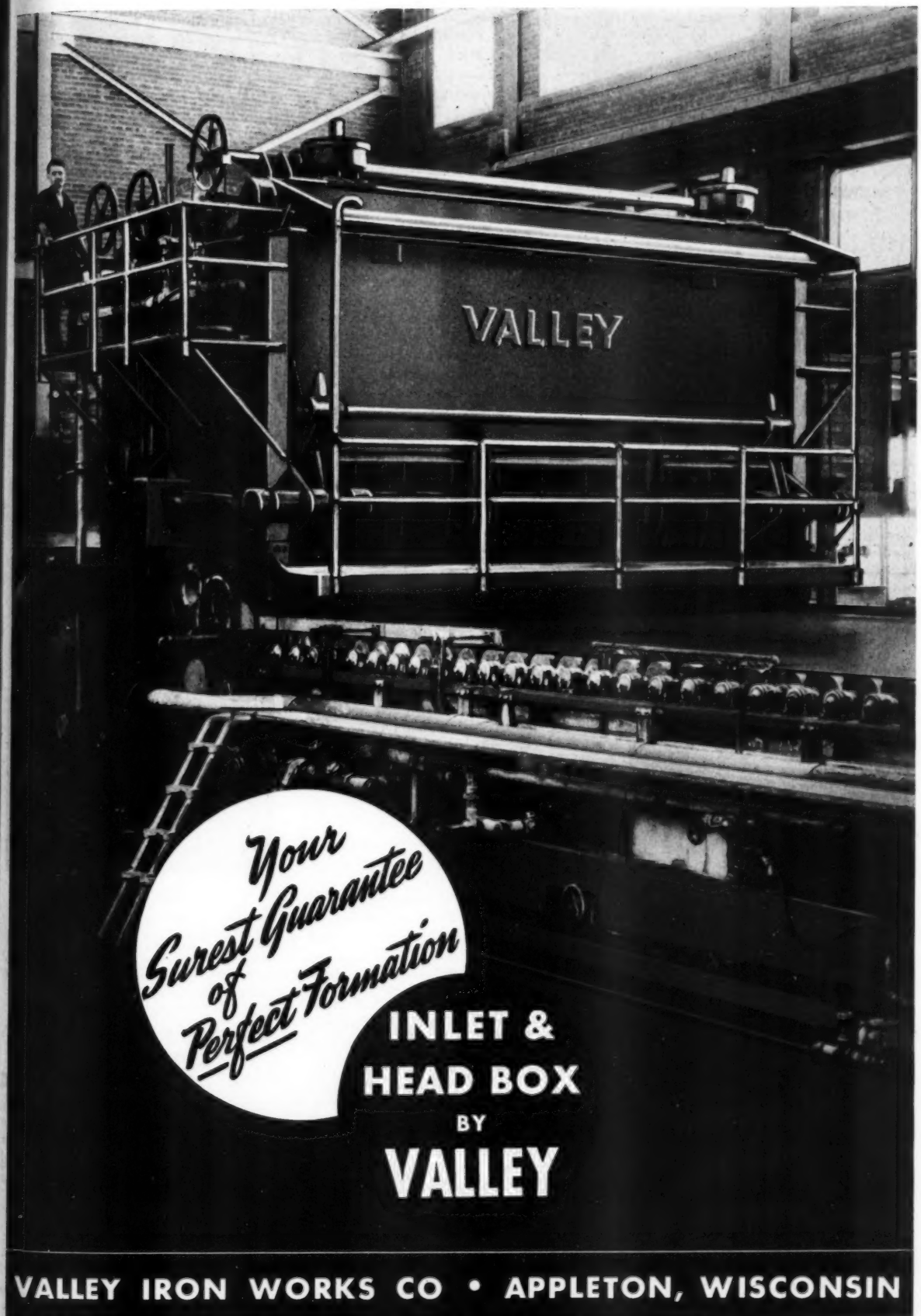
he developed converting machinery and served as design engineer in the modernization of several mills. Since that time, he has held important positions in engineering and executive capacities for a number of important companies in Wisconsin and Michigan.

◆

▶▶▶ The resignation of *J. F. Mitchell-Roberts,* manager of the Foreign and Export Division of Oliver United Filters, Inc., New York City, terminates an association with the company which dates from 1920. His duties with the company have taken him to many foreign countries in connection with filtration and clarification problems.

◆

▶▶▶ The last civilian position of *Major Victor I. Safro* was that of manager of the Calcium Carbonate Department of Wyandotte Chemicals Corporation. Major Safro served in


VALLEY
Your Surest Guarantee of Perfect Formation
INLET & HEAD BOX
BY
VALLEY
VALLEY IRON WORKS CO • APPLETON, WISCONSIN

World War I as a lieutenant in the Air Corps. He passed away at Mitchell Field Hospital, Hempstead, Long Island, on May 24, preferring the chance of hospitalization to that of a physical discharge from the Army Air Force.

◆

ERNST MAHLER MADE MEMBER OF THE BOARD OF ALLIS-CHALMERS

The Allis-Chalmers, Milwaukee, Wisconsin, has announced the election to its directorate of Ernst Mahler, executive vice president of the Kimberly-Clark Corporation, Neenah, Wisconsin. Mr. Mahler succeeds R. G. Hutchins, New York, who retired after 31 years of service on the board.

Mr. Mahler has been with Kimberly-Clark since 1914. He is a chemical engineer and the holder of many patents in the pulp and paper field. He has served as chairman of the overall advisory committee to the WPB for the paper industry.

During World War I, the new Allis-Chalmers director developed a cellucotton wadding and absorbent from spruce cellulose which played an important part in relieving the shortage of surgical cotton. Out of this development resulted such products as facial tissue and insulating material.

Ernst Mahler

For this achievement, he was awarded the medal given annually by the Technical Association of the Pulp and Paper Industry at its annual meeting in 1933.

In 1929, Mr. Mahler interested a number of other manufacturers in founding the Institute of Paper Chemistry which is now the outstanding educational and research center for that industry.

▶▶▶ A vacancy in its directorate, caused by the death of George W. Plaisted, was filled recently, when The Austin Company, Cleveland, announced the appointment of *J. K. Gannett* as a director of the company. Mr. Gannett, a vice president, recently was appointed director of engineering and research. He has moved his headquarters to the company's general offices at Cleveland.

◆

▶▶▶ The Position of Technical Director of Paisley Products, Inc., Chicago, will be filled by *Laurent J. Labrie,* who served as chief of heavy chemicals unit of the OPA from 1942 to 1944. Mr. Labrie is a graduate chemical engineer and has had a wide experience in industrial chemical product development. Under his direction, the synthetic resin adhesives and thermoplastic coating division of the company will be expanded and co-ordinated with the industrial research program of the Paisley starch and dextrine adhesive divisions.

◆

▶▶▶ As assistant to *Dr. C. L. Knowles* (P. I. & P. W., June, 1944, p. 344) *Roman Chelminski* has become associated with General American Process Equipment. He will be located at the New York office of the company, 420 Lexington Avenue. Mr. Chelminski recently has been a member of the Eastern Sales Division of the Dorr Company, Inc. Formerly, he was associated with the company's European activities.

◆

▶▶▶ New field representatives of the New York office of Mathieson Alkali Works are: *H. P. Smith,* formerly president of the George Chemical Company; and *Thomas T. Schulten,* formerly with the General Chemical Company.

◆

▶▶▶ A new connection has been made by *Marcel A. Cordovi,* formerly research assistant welding research council of the Engineering Foundation. He has just joined the metallurgical staff of The Babcock & Wilcox Tube Company as research metallurgist.

◆

HARING HEADS CED POSTWAR MARKETING RESEARCH PROJECT

The CED has launched a program which is referred to as the largest market research project ever undertaken. This program is called the Postwar Marketing Research Project of the Committee for Economic Development. It went into operation the week of June 20.

Chester E. Haring, former vice president and director of marketing for Batten, Barton, Durstine & Osborn, and previously market research director for Fuller & Smith & Ross Advertising Agency, is in active charge of the project. Assisting Mr. Haring is J. L. Barrett, recently administrative engineer with George S. May Company, Chicago.

This project sets up specialized procedure to enlist trade associations and leading manufacturers in each field whose participation is essential to its success.

◆

▶▶▶ After 20 years with the Paper Makers Chemical Department of the Hercules Powder Company, *Charles (Bud) Mueller* has been appointed

Charles Mueller

sales representative for the New England territory of Bulkley, Dunton Pulp Company, with headquarters in the company's New York offices.

◆

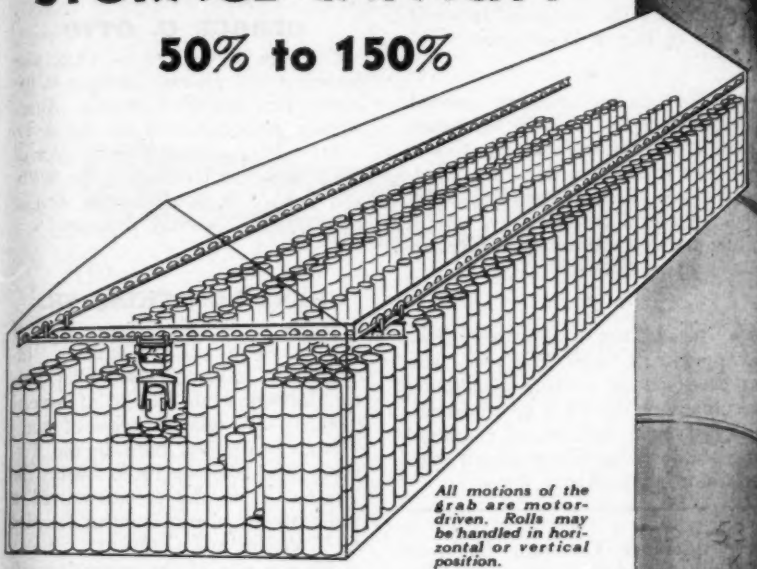
CAPT. I. F. ELDREDGE RETIRES FROM ACTIVE FORESTRY SERVICE

After almost forty years of forestry experience, Captain I. F. Eldredge leaves the staff of the Southern Forest Experiment Station where he has served as director of the forest survey of the Lower South since 1932.

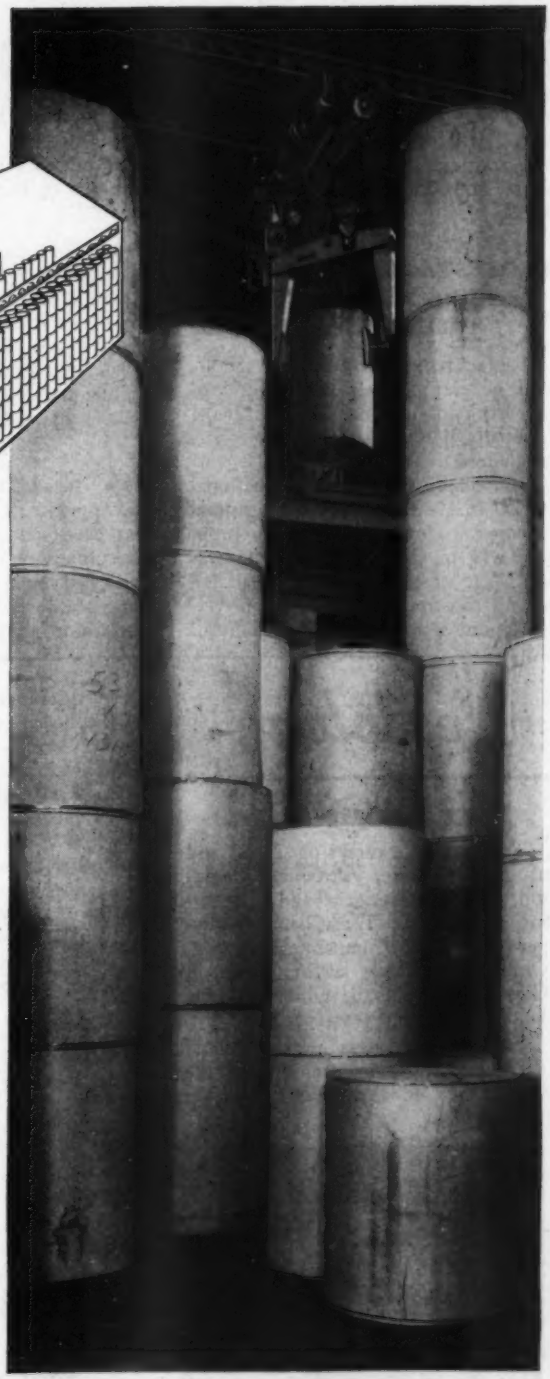
Upon completing his schooling at Biltmore Forest School, North Carolina, in 1905, Mr. Eldredge's first assignment was on the Sierra National Forest in California. He served in World War I as Captain of Engineers,

INCREASE ROLL STORAGE CAPACITY

50% to 150%



All motions of the grab are motor-driven. Rolls may be handled in horizontal or vertical position.



From 50% to 150% more rolls can be stored in a building that is of sufficient height to accommodate a Cleveland Tramrail overhead crane and motor-driven roll grab, because:

1. The entire floor area is utilized.
2. No aisle space for floor handling equipment is required.
3. Rolls are piled vertically 6 or 7 high (42 feet or more).

Rooms with many thousands of rolls can usually be served efficiently with only one man who handles all operations from the crane cab. Even where there are 50 or 100 different paper classifications, any type roll may be quickly stored or retrieved.

Reduction in paper spoilage is another of the many advantages of the Cleveland Tramrail method. In some plants this means a savings of 1% of all paper handled.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1165 East 283rd St. Wickliffe, Ohio.

CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

and has been active in the Society of American Foresters, which organization recently paid him the honor of elevating him to the rank of "Fellow." Following retirement, Mr. Eldredge will live in New Orleans and will continue his contacts with foresters and forestry activity in the South.

◆

SHOFFSTALL, GEN. MGR. INCO'S HUNTINGTON PLANT HAS RETIRED

The retirement of Arthur S. Shoffstall, general manager of the Huntington Works of The International Nickel Company, Inc., effective June 30 was announced recently.

Mr. Shoffstall joined International Nickel in 1908. He has been general manager at Huntington since the property was purchased, in fact, he was in charge of the planning which led to the construction of the plant.

Appointed to succeed Mr. Shoffstall is Herman M. Brown, who has been assistant general manager. John A. Marsh, general superintendent, has been named assistant general manager. Mr. Shoffstall has agreed to continue in the capacity of a consultant to the head office of the company, and will continue to live in Huntington.

◆

▶▶▶ The former assistant general manager of sales for The Mathieson Alkali Works, New York City, *Dewitt Thompson,* has been promoted to Lieut. Commander in the U. S. Naval Reserve. He is a past president of the Salesmen's Association of the American Chemical Industry.

◆

▶▶▶ In addition to resuming private law practice, *Charles E. Vance,* who has been serving as district rationing executive with the OPA in Cincinnati, will become a member of the legal staff of the Philip Carey Manufacturing Company, Lockland, Ohio.

Necrology

ALEX. THOMSON, JR.

Terminating a career of service and of great promise, Alexander Thomson, Jr., vice president and advertising manager of The Champion Paper and Fibre Company, Hamilton, Ohio, passed away at his home in Glendale, Cincinnati, Ohio, on June 18. He was 35 years of age.

Mr. Thomson was a grandson of Peter G. Thomson, founder of the Champion company. His father, the late Alexander Thomson, Chairman of the Board of the company, was the second son of the founder to succeed to the presidency.

Alexander Thomson, Jr., had been directly connected with the company since 1929, in sales, advertising, and executive capacities. In the fall of 1939, he was elected a vice president of the company, having served previously as advertising manager. He had filled both offices since that time.

Since the beginning of the War, Mr. Thomson had given unstintingly of his services to wartime activities. He served with the American Red Cross, and while in Cairo, Egypt, contracted a fever which aggravated an ailment he had suffered from for some time. He was compelled to give up that work and returned home in October, 1943.

Mr. Thomson is survived by his widow, a son and a daughter. He leaves also his mother and three brothers, two of whom are in the Service.

Alexander Thomson, Jr.

◆

BEN ALEXANDER

On July 6, Ben Alexander, president of the Masonite Corporation, Chicago, passed away at Rochester, Minnesota. He was 49 years of age.

Mr. Alexander was the son of the late Walter Alexander, prominent industrialist of Wausau, Wisconsin. When his father passed away, he succeeded him as president of the Wausau Paper Mills Company, of Brokaw, Wisconsin. He left that city to reside in Lake Forest, Illinois, when he took over the official duties as president and general manager of Masonite. He served on the War Production Board under Donald Nelson.

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GEORGE G. OTTO

On July 4, George G. Otto, vice president and general manager of the Alton Box Board Company, Alton, Illinois, passed away at the age of 49.

Mr. Otto has served as director of the Paperboard Division of the WPB, and is credited with having devised the wastepaper salvage program.

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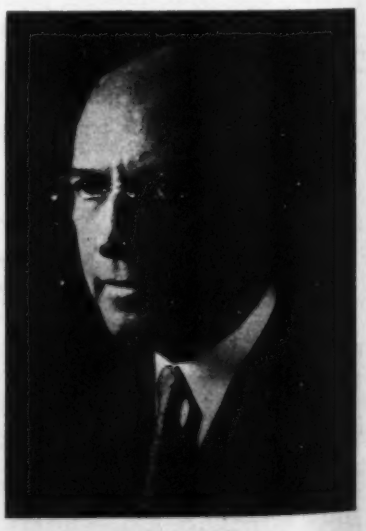
HENRY C. ATKINS, SR.

Henry C. Atkins, Sr., president of E. C. Atkins and Company, Indianapolis, Indiana, passed away June 15, following an illness of several months. He was 76 years of age.

Mr. Atkins was born in the Territory of Idaho, in 1868. When he was just a boy, his parents moved to Indianapolis, where his father founded E. C. Atkins and Company.

He was one of the original pupils of the Indianapolis Classical School, from which he was graduated with honors. At the age of 16 he entered Yale University, from which he graduated in 1889, one of the youngest men of his class. He returned to Indianapolis after graduation and became superintendent of the Atkins plant. In 1892, he was elected vice president, and in 1901 he was elevated to the presidency of the company.

Mr. Atkins became a civic leader in his home city, and he was well known in a number of national organizations. He is survived by his widow and three sons.



Henry C. Atkins, Sr.

WYANDOTTE CHEMICALS CORPORATION

one of the world's great producers of basic chemicals

CAUSTIC SODA • CALCIUM CHLORIDE

SODA ASH • CHLORINE • CALCIUM CARBONATE

BICARBONATE OF SODA • HYDROGEN

AROMATIC INTERMEDIATES • DRY ICE

WYANDOTTE CHEMICALS CORPORATION • Michigan Alkali Division
WYANDOTTE, MICHIGAN

INTERCHANGEABILITY *Speeds* Maintenance

THE wide interchangeability of parts designed into "Renewo" and "Ferrenewo" valves has long proved a boon to maintenance men in making their job easier.

Since valves control the very life lines of productive processes—steam, air, water, oil, gas and other fluids—it follows that every precaution be taken to insure proper functioning.

Regular checking and inspection, and prompt servicing when necessary, will be repaid in more efficient performance and longer valve life, and may well prevent possible shut-down of equipment for more costly repairs later.

The simplicity of design of Lunkenheimer "Renewo" and "Ferrenewo" valves, with interchangeable parts, makes it easy to keep them in good operating condition with minimum expenditure for maintenance.

Lunkenheimer distributors are located in all industrial centers. Use the facilities of the one nearest you for service on your requirements.

ESTABLISHED 1862
THE LUNKENHEIMER CO.
"QUALITY"
CINCINNATI 14, OHIO, U. S. A.
NEW YORK 13 · CHICAGO 6
BOSTON 10 · PHILADELPHIA 7
EXPORT DEPT., 318-322 HUDSON ST., NEW YORK 13, N. Y.

SIMPLICITY OF DESIGN
MEANS
EASIER MAINTENANCE

200 lb. S.P. Bronze
"RENEWO"
Regular Type

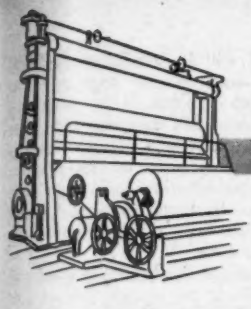
200 lb. S.P. Bronze
"RENEWO"
Plug Type

150 lb. S.P. Iron Body
"FERRENEWO"
Regular Type

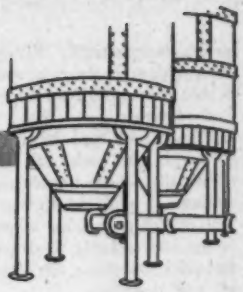
Here's how Interchangeability Speeds Maintenance . . . . . .

All parts of the valves above (except bodies and bonnet rings) fit each other perfectly. If, for example, you need a stem, disc or seat ring for the "Renewo" you can use the corresponding part of the "Ferrenewo", *it is exactly the same.* This means fewer parts to be carried, speedier repairs and greater ease in making them.

LUNKENHEIMER VALVES



Practical SHORTS



Readers are invited to submit short, practical articles for this department. The items should be original and should relate to ways and means of handling production and maintenance jobs. Where possible, articles should be illustrated. Rough sketches only are required. Payment will be made for acceptable items upon publication.

How to Select Valves

What fluid? The first step in good valve selection is to determine whether the fluid can be handled with the usual brass, iron, or steel valve, or whether some other alloys or materials must be used.

First, will the fluid corrode these metals? This applies to the main parts or shell of the valve and to the trim, that is, the seats and spindle. A fluid which will slightly attack or roughen these three common metals may be used in the body and bonnet if the proper material is used in the trim. For instance, cast iron is very slightly rusted by water but a cast iron valve with brass trim is ideal for water service. On the other hand, some fluids commonly used in industrial processing do not attack iron but do attack brass and this dictates an all iron valve. Brass valves, except in rare cases, are trimmed with brass or a copper alloy that has pretty much the same resistance to corrosion as the brass itself. Several trims are common in steel valves, the selection depending in part on corrosion, but more often on temperature.

Common knowledge or experience will usually supply the answer but if not, it is a job for a metallurgist or chemist.

In some cases, the fact that the fluid is either explosive or burns readily or is poisonous, will determine that steel valves should be used as a matter of safety rather than brass or iron valves, which might otherwise be adequate.

What temperature? The principal effect of temperature is on the strength or other physical characteristics of the valve materials. Generally, cast iron valves may be used up to a temperature of 450 Fahr. and brass valves up to 550 Fahr. At higher temperatures, steel is the selection and as the temperature rises above 750 Fahr., alloys, most commonly carbon molybdenum steel, are used.

Considering trim, brass may be used up to 550 Fahr. For steel valves, however, brass trims are seldom employed in marine service. Alloys of principally copper and nickel against a stainless steel or preferably properly heat treated stainless steels alone are used up to 750 Fahr. The latter may be used at higher temperatures in oil services, but for other services we usually turn to such material as stellite.

Screwed or flanged end connections are usually employed up to 750 Fahr. above that welding ends.

A less frequent influence of high temperature is in increasing the corrosive action of fluids. A fluid which it may be practicable to handle with cast iron at ordinary temperatures, will so actively corrode the cast iron at boiling temperatures as to require the use of another metal.

A third consideration which may enter is very low temperature. Below freezing, many metals become brittle and once again, alloys may be necessary, frequently a nickel steel.

What pressure? Pressure determines first whether one of the standard classes of valve can be used or whether some special design is necessary. A group of National Standards is the foundation for these pressure classifications. Manufacturers' lines as shown and described in their catalogues usually are based on these National Standards and the catalogue showing specifies the primary and sometimes, secondary rating for which a particular valve is recommended. The difference between primary and secondary rating is usually one of temperature. In the case of brass or iron valves, this difference of temperature is generally indicated by stating one rating for steam services and the second rating for oil, water and gas services. In the case of steel valves, there is a very complete set of tables at pressure-temperature ratings in the Standards.

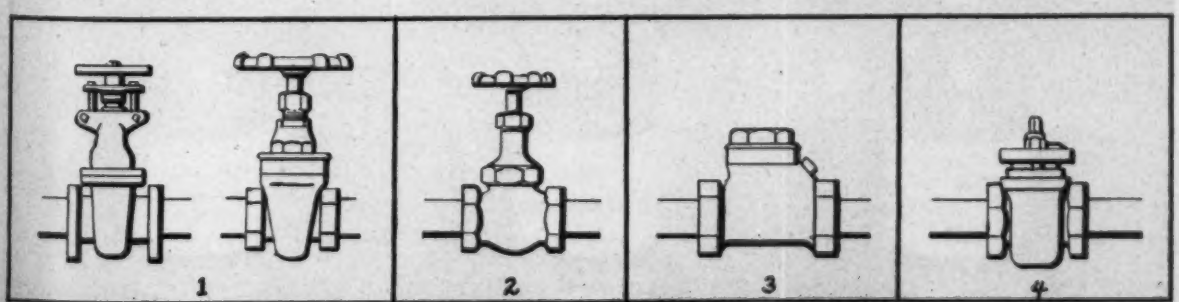
Secondarily, pressure may determine the valve materials. For instance, very high pressures may indicate steel as the most economical and best material to employ rather than iron.

What size? The size of the pipe line in which the valve is to be used has generally been determined in accord with necessary capacity in advance of selecting the valve. In practically no case does any feature of the valve dictate changing this size, although in designing the pipe line, the accumulated pressure losses through all the valves may be a factor. But the valve size will follow the size determined for the line.

If the temperature has not indicated welding ends, screwed ends are usual up to the 2-in. size and flanged ends for larger sizes.

The size influence on valve materials is that between brass and iron valves, brass is usually employed 2 inches and small and iron valves in the larger sizes. When steel valves are indicated, forged valves are usual below the 2-in. size and cast valves in larger sizes. The consideration is principally one of economy. It usually costs less to build a good valve all of brass below the 2-in. size and of iron with brass trimmings above the 2-in. size. But various other considerations of corrosion, appearance, user's preference, etc., will vary the size at which this change from one metal to another is made.

What is the valve to do? In the greatest number of cases, a valve is wanted to allow the fluid to flow in the line or to stop it from flowing. That is a simple shut-off. Gate valves are best suited for this purpose. If there is room, the outside stem and yoke type is usually employed as it both gives good indication of position and gets the operating thread outside of the valve. The stationary spindle type may be used because of lack of space or sometimes because of lower cost. Wedge gate valves are being found to give best



How to Know Valves: (1) Gate Valve—Height greater than length. From bottom of body to top of bonnet more than twice pipe diameter. (2) Globe Valve—Pot-bellied or more rounded body than a gate valve. (3) Check Valve—A globe valve without the stem. (4) Cock—Cylindrical shape body. Topped by square head on plug.

service in practically all operating conditions, although there is some selection of double disc type for very low pressure or ease of repair.

The second type of valve for shut-off service is the cock. Its use is indicated principally where liquids carry solids, precipitates or pulp which may get under the seat of the gate valve to prevent its operation. Secondarily, it is used because of its quick operation, its disadvantage is in its stiff operation.

A valve is frequently desired for regulation, that is, to reduce either the amount which is flowing through the line or the pressure. If the setting need only be changed occasionally, a hand operated globe or angle valve may be used. If constant change of the valve position in order to uniformly maintain the lower pressure or temperature beyond the valve is desired, then the automatically operating pressure reducing valve is in order. Frequently, valves in low pressure services may have brass, asbestos or similar ring discs for easy removal of wearing parts. In average cases, the common metal to metal disc seat may be used but as the severity of throttling or exposure to corrosion increases, broader contact surfaces at the seat and harder metals are employed.

The last requirement for a valve is that it may prevent backing up or reversal of the flow. For this purpose, the check valve is employed. The swing check valve will be the choice in most cases because of the straight flow, freedom from sticking and low pressure drop. But as velocities get very high, there is change to the lifting disc type. READING-PRATT & CADY, *a Division of American Chain & Cable Company, Inc.*

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Removal of Glass Stoppers

Difficulty is sometimes experienced in removing a glass stopper which has become "frozen" in place in the neck of a bottle.

The mistake is often made of striking the top of the stopper in attempting to loosen it. This practice frequently results in breaking the stopper off flush with the neck of the bottle. When this occurs, further attempts to remove it are usually fruitless.

A particularly effective procedure for removing a glass stopper from the neck of a bottle is as follows:

Place the bottle in a sink or in such a place that no damage or injury can result should it be broken.

Grasp the top of the stopper firmly in one hand exerting on it a slight steady pull. Using a glass stopper held in the other hand, strike the neck of the bottle sharply at a point as shown in the illustrations.

In nearly every case, one or at most two sharp blows will loosen the stopper so that it can be removed without effort.

If a spare glass stopper is not available, some other object may be used, but experience has shown that nothing else is quite as effective as glass.

Rubber gloves should be worn because of the possibility that the contents of the bottle may spurt out on the hands due to the suddenness with which the stopper is removed. This is particularly liable to occur when the bottle contains a volatile compound, such as nitric acid or hydrochloric acid. For the same reason, the face should be kept as far as possible from the bottle while this operation is being carried out.—GENERAL CHEMICAL COMPANY PRODUCTS BOOK.

◆

Rules for Safe Operation of Power Trucks

1. *Move control levers firmly from one speed to another and without hesitation.* This is to prevent arcing, which pits the contact surfaces of the switch. If you allow these contacts to become damaged you may fail to get the expected response from your control lever at a time when you want it very much.

2. *Keep your head as low as possible when moving.* There is no danger of tipping a load carried at a low level. Keep it low enough so that you can see over it.

3. *Keep your truck behind the load.* If you should get off suddenly, or fall off, then the load will be moving away from you, and it can do you no harm. When going up steep inclines, it is sometimes better to reverse this position and have the truck pull the load.

4. *Avoid making quick or jerky stops.* The momentum of the load may play tricks on you. Be especially careful about stops when you have a load elevated for tiering or stacking.

5. *If your truck has a tilting device—use it.* By tilting the upright toward you the weight of the load is brought back slightly and the balance is improved. This slight tilt of 10 to 15 degrees will avoid spilling the load when rounding corners.

6. *Go easy when approaching danger points.* These are: elevator gates, pits, bridges, inclines, tunnels and tracks. Get the habit of crossing tracks diagonally instead of at right angles.

7. *Take a good look at your load before you pick it up.* If you have to move a doubtful load, *slow down.*

8. *Be sure to pick up every load squarely.* Then there is no danger of the load shifting, due to offside loading, while you are in motion. When small boxes in pallet or skid lots are raised above the uprights, be sure that those on the back corners have not shifted to fall on you. Insist on wide load back rests.

9. *Report rubbish on floors to your foreman.* You and your truck are safer on clean runways.

10. *Don't cut corners.* You are in danger of having to stop quickly—lose the load—hurt someone or damage the goods.

11. *Keep your truck clean.* Dirt and rubbish make your footing uncertain and may cause trouble if obstructions lodge somewhere in the mechanism.

12. *Don't carry passengers.* You need all the room you have, for perfect control of your truck.

13. *Don't allow others to operate your truck.* They may injure someone, or damage the truck or tires. It takes time to get spare parts these days.

14. *Report need for repairs immediately.* Repairs take the least time when they are made promptly.

These rules are intended to supplement

the basic instruction of the operator and to interpret the general precaution to "Drive Carefully." In most cases, it would be advisable to modify them by specific reference to local conditions, such as observance of one-way routes, hints for checking loads before pick-up, etc—THE ELWELL-PARKER ELECTRIC CO.

◆

Swinging Scaffolds

When working from swinging scaffolds, observe every precaution, including the following:

1. Never overload a scaffold.
2. Use nothing but secure knots and hitches, and make sure that ropes are securely attached.
3. Always tie the fall lines to the scaffold, itself; never to any part of the building.
4. When using acid or caustic solutions, take every precaution to keep them from getting on scaffold ropes.

Courtesy National Safety Council

5. Jumping onto or from a scaffold is dangerous; do not climb or slide down the suspension ropes.
6. Remove all loose objects from the scaffold when stopping work for meals or when leaving for the day.
7. Be sure to lash the scaffold to some permanent support so that in case of sudden storm, it will not swing violently.
8. No work should be done on swinging scaffolds during stormy weather.
9. Spread a canvas drop on the under side of a scaffold when painting or when the area below is used as a passageway. Safety Instruction Card No. 334, NATIONAL SAFETY COUNCIL.

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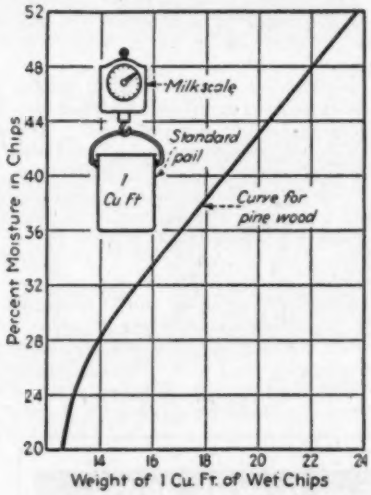
Rapid Method of Determining Moisture in Wood Chips

Moisture content of wood chips greatly affects the amount of wood to be put into a pulp digester, and is a factor to be considered when computing liquor volumes and concentrations. To obtain uniform cooking, it is necessary, therefore, to know the moisture content of the chips in each digester.

Weighing a standard can or pail which is just level full with moist chips is the simplest and quickest method of obtaining the moisture percentage for a sample representative of the chips charged into a digester. Within the normal range of chipping, there is not sufficient variation in chip size to affect the accuracy of this testing method. Also, it is readily possible to fill the standard can in such a way that bulk density variations will not affect the results significantly. Wood chips cannot be packed to any appreciable extent and a few shakes and jars will settle them to a stable position.

A suitable method of filling the can is to fill it about one-third full and shake briefly by lifting and dropping the can 2 or 3 in. several times. The same procedure is then repeated with the can two-thirds full and again when full. The can is then levelled off at the top with any additional chips necessary and weighed.



Simple and inexpensive equipment can be used for this test. A 1-cu. ft. pail can be constructed easily, or the result can be calibrated for a pail of other dimensions. A common milk scale, which can be set to give a zero reading with the empty pail and can be hung anywhere, is suitable for the weighing. The total cost of the equipment is only about $15 and results can be read well within 2 percent of the correct moisture percentage.

The accompanying chart shows a curve of moisture content versus weight which was prepared here for pine chips. A similar curve should, of course, be prepared for the type of chips being used. The chips can readily be sampled throughout the loading period of the digester, or they can be taken from the chip conveyor. Malcolm G. Lyon, Champion Paper & Fibre Co. (The Plant Notebook of Chemical & Metallurgical Engineering.)

◆

Cutters for Brass Pipe

The cutters used for cutting brass pipe may be the same as those used for iron pipe. But owing to the fact that brass is easier to cut, the cutter wheels may be thinner. This materially reduces the burr which forms inside the pipe as the cutters penetrate. Any cutter that will cut iron or steel pipe can be used on brass pipe successfully. Also any reamer, and any reaming process used on iron or steel pipe will work equally well on brass pipe.

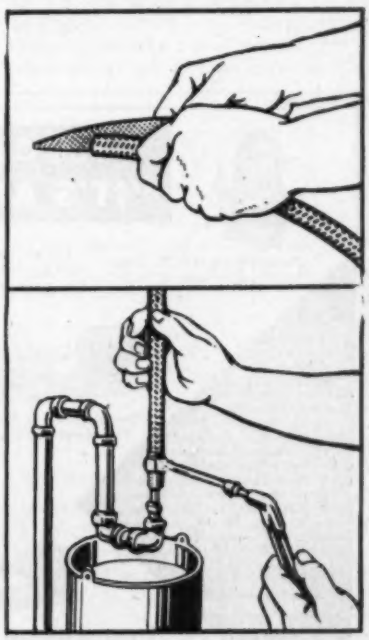
Ordinary hack-saws are often used for cutting brass pipe. In fact, many mechanics prefer to use hack-saws. It is a matter of personal choice or convenience as to whether cutters or hack-saws are used. Either will work satisfactorily, and both are in common use.—COPPER AND BRASS RESEARCH ASSOCIATION.

◆

Soldering Flexible Metal Hose and Tubing

Soldering of flexible metal hose and tubing is best accomplished using a soldering stand and an aluminum soldering plug.

Place the coupling over the plug and apply heat by means of an illuminating gas flame. Fill the bore of the coupling approximately two-thirds full of solder, using sufficient flux to permit the solder to flow properly. Continue to apply heat to the coupling and insert the tubing (after burning) over the soldering plug and slowly push it down into the bore of the coupling, rotating it until it reaches the bottom and all cavities are filled with solder. Remove heat and quench the coupling with water. Clean the assembly in hot water.



Above—Burring; Below—Soldering.

Caution: Apply heat to the coupling only. Do not apply heat to the tubing. If other flame beside illuminating gas is used, apply heat sparingly so as not to damage the metals.

Approved Materials

Flux—Zinc chloride or rosin base type
Solder—50-50 type or equal

Caution: Do not use flux employing ammonia or which will liberate ammonia gas.—TITEFLEX, INC.

Have You Tracked Down Hidden Wastes?*

▶▶▶ YOUR COMPANY'S PROFITS can be greatly increased if you and your associates will find and control unsuspected wastes in your operations. Here are 225 searching questions designed to help administrative and production executives find and control these hidden wastes. Your engineers and paper technologists should also examine these questions which strike comprehensively at the direct and indirect factors causing production wastes of from 25% to 50% in most plants.

Have every man in an executive or managerial capacity check this list and supply written reports on all questions pertaining to his functions. Then hold a series of staff meetings and consider every answer microscopically.

1. Administrative Controls Over Waste

(1) Do you have an organization chart? (a) Prepared how long ago?; (b) Is some one responsible for keeping it up to date?; (c) Is it up to date now?

(2) *Is there a straight flow of authority* in your organization setup? (a) Any conflict or overlapping of authority?; (b) In the case of each executive, does the attendant responsibility accompany the authority granted?

(3) Do you have a written manual for each executive detailing his specific duties and responsibilities? (a) Do such manuals include a clear delineation of all company policies and procedures which can be set forth in definite terms?; (b) Who is responsible for keeping these manuals up to date?; (c) Are they up to date now?

(4) Do you have a well-worked out plan of understudies? (a) For major executives?; (b) For minor executives?; (c) Any system of promotion from the ranks?; (d) Any methods of study and tests to determine eligibility for promotion?

(5) Do you have personnel records? (a) Are they kept up to date?; (b) Are they complete enough as to quality and quantity of performance?

(6) Do you have a complete, modern cost and accounting system? (a) Are costs broken down for each department?; (b) For each operation or assembly?; (c) Are department heads held responsible for costs in their departments?; (d) How long since your cost and accounting system has been scientifically analyzed and brought up to date?

(7) Are costs estimated for each department and operating unit? (a) Is responsibility fixed for keeping actual costs within estimated costs, by each department or operating unit?

(8) Do you have adequate *operating reports* to enable you to plan on a sound basis and quickly observe and check excessive cost? (a) Monthly budget comparison covering: (1) Expense?, (2) Production?, (3) Labor?; and (4) Plant and equipment?; (b) Reports of weekly results?; (c) Reports of plant activity?; (d) Production labor and burden?; (e) Idle Time?; (f) Costs of: (1) Production?, (2) Labor?, (3) Materials?, (4) Manufacturing?, (5) Estimate and actual?, (6) Raw materials?, (7) Supplies and small tools?, (8) Direct and indirect labor?, (9) Controllable expense?, (10) Spoilage?, (11) Idle machines?, (12) Machine repairs?, (13) Departments?, (14) Inspection?, and (15) Stores?

(9) How long since all records and forms were checked for simplification and avoidance of duplication?

(10) Has office arrangement been checked recently for best flow of order and billing procedure?

(11) Do you have supervisory incentives for executives and key employees? (a) Based on proper individual performance?

(12) *Is your research department adequate?* (a) For present needs?; (b) For post-war planning?

(13) Have you checked employment procedure recently? (a) Adequate tests to determine employee's best capabilities?; (b) Have you a definite training program for new employees?; (c) Are vacancies supplied by upgrading as much as possible, so as to fill lowest positions with new employees?

(14) Any systematic record kept showing tabulated causes of employees leaving, discharged or laid off? (a) Have you analyzed as to causes under your control?; (b) Before discharging, is any effort made to test employee's ability for other work?

(15) Have you analyzed temporary shutdowns as to how adequate controls might have prevented them? (a) Labor trouble? (Wage Incentives); (b) Unbalanced production? (Production and Materials Control); (c) Breakdowns? (Preventive Maintenance); and (d) Lack of planning? (Administrative Controls)?

(16) What was labor turnover for 1940, 1941, 1942? (a) How does it compare with comparable industries in your area?; (b) What percentage of new employees make good?; (c) Have you studied effect of labor turnover on production and cost?

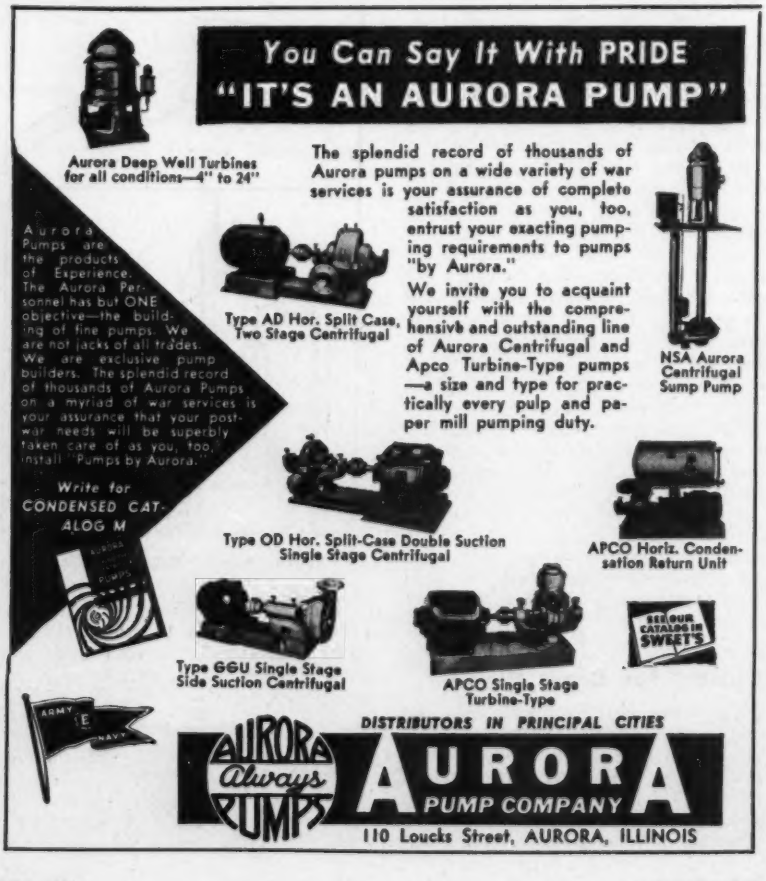
(17) Have you a wage incentive plan? (a) Based on fair and sound standards?

(18) How much waste in productive time during 1940, 1941 and 1942 due to strikes and lockouts?

(19) How many accidents during 1940, 1941, and 1942? (a) What was the cost per year as a result of such accidents? (Compensation insurance and damages awarded, wages paid during incapacity); (b) What percentage might have been prevented by adequate safety measures?; (c) Anyone specifically responsible for safety control?

(20) How adequate is the company's welfare work? (a) Locker facilities, conveniently placed?; (b) Toilet facilities, conveniently placed?; (c) Convenient restaurant or lunch facilities?; (d) Rest

(*) Adapted from Report No. 148, published by George S. May Business Foundation.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The splendid record of thousands of Aurora pumps on a wide variety of war services is your assurance of complete satisfaction as you, too, entrust your exacting pumping requirements to pumps "by Aurora."
We invite you to acquaint yourself with the comprehensive and outstanding line of Aurora Centrifugal and Apco Turbine-Type pumps —a size and type for practically every pulp and paper mill pumping duty.
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Type GGU Single Stage Side Suction Centrifugal
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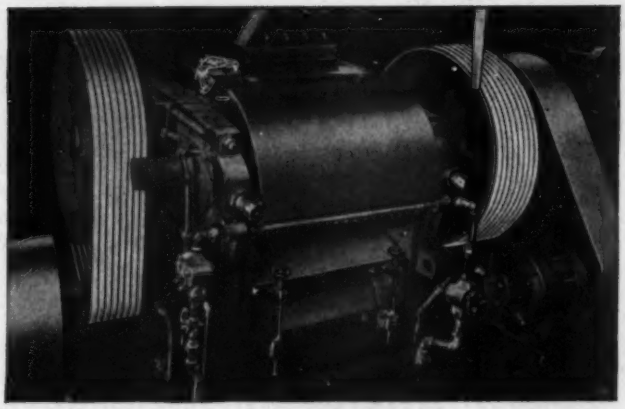

* **One TYPICAL EXAMPLE**

On these flaking rolls where gas flames create considerable heat, Gates V-belts of special synthetic rubber are used because of their proved ability to withstand bad heat and oil conditions. By actual records, on hundreds of installations where oil or heat conditions are severe, Gates special synthetic V-Belts are wearing 2 times to 3 times as long as any natural rubber belts ever used.

Through More Than 6 YEARS in Hundreds of Plants *

GATES *Synthetic Rubber* V-Belts

—Have Been OUTWEARING Any NATURAL Rubber Belts Ever Used!

Now that all industry depends on belts made of synthetic rubber, it is well worth-while to know that Gates Synthetic Rubber V-Belts have been in nation-wide use for more than 6 years—and *through all that time* they have been giving service actually *superior* to belts of *natural rubber!*

***There are, of course, many kinds of synthetic rubber. Gates uses each kind where it best meets some particular service need.**

For example:—one special synthetic rubber which Gates uses extensively in making V-Belts has the ability to withstand oil and heat much better than natural rubber can. Where oil and heat conditions are especially severe, Gates special synthetic V-Belts are giving *3 times* to *4 times* the service life of *any natural rubber* V-Belts ever used.

This is the record not of a few belts over a limited period but of thousands upon thousands of Gates synthetic rubber V-Belts installed in hundreds of plants and factories during the past 6 years.

Gates long headstart in fabricating V-Belts of synthetic rubber is of greater importance to you now than ever before because *all* the V-Belts furnished industrial plants today are of *synthetic rubber.*

You will gain a distinct advantage in V-Belt service by simply picking up your telephone directory and calling the Gates Field Engineer. He will bring right into your plant the full benefits of Gates knowledge and experience without the slightest obligation.

447

THE GATES RUBBER COMPANY

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DETROIT, MICH. 8663 Grand River Avenue
PORTLAND, ORE. 333 N. W. 5th Avenue
DALLAS, TEXAS 2213 Griffin Street
SAN FRANCISCO, CAL. 1090 Bryant Street

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Boston, Mass. Pittsburgh, Pa.

rooms?; (e) Rest periods?; (f) Recreation facilities?; (g) Transportation facilities?; (h) Housing conditions?

(21) Do you have a planned method of encouraging workers to make *suggestions?* (a) Rewards for adopted suggestions?

(22) Do you have tabulated record of time lost by employees due to ill health? (a) Cost of such lost time?; (b) Analysis of unhealthy conditions?

(23) Are authority and responsibility placed in one man for all purchases? (a) Maximum and minimum stocks properly determined?; (b) Closely co-ordinated with production schedule and accurate estimate data?; (c) Quality and grade of material properly controlled by adequate specifications?; (d) Material adequately inspected and tested on receipt?; (3) Methods of co-ordination and control between purchasing and planning heads as to sufficient time for obtaining materials needed?; (f) Proper follow-up on time of delivery?; (g) Sufficient turnover in material?; (h) Comparative loss in "dead stock" over period of last three years?

(24) What methods do you have for enlisting active interest and encouraging suggestions from department heads, superintendent and foremen?

(25) Do you have staff meetings? (a) Committees for study of specific problems?

2. Waste of Space

(1) *Are you utilizing plant space to best advantage?*

(2) Have you had a plant layout made? (a) How recently?; (b) Does it show in detail all departments, machines and work areas?; (c) Any back-tracking or criss-crossing in flow of work?; (d) Is material storage located most strategically?; (e) Is space going to waste on pillars and upper air area which could be utilized for space-saving arrangements?; (f) What responsibility is delegated for continuing study of plant layout?; (g) Have you held any staff meetings for suggestions of better plant layout?; (h) How recently?

(3) Who is responsible for plant housekeeping? (a) Are aisles kept clear?

(4) Could you use blank side of machines for banks of material, thus better utilizing space to gain accessibility and eliminating excess handling?

3. Waste of Productive Time

(1) Are skilled workmen required to do jobs which could be performed by less expensive labor? (a) Grinding and sharpening of tools?; (b) Machine setups?

(2) Are tables and charts posted conveniently for quick reference?

(3) Is time lost deciphering poorly prepared and incomplete instructions?

(4) How much productive time is lost due to: (a) Waiting for materials?, (b) Waiting for parts?, (c) Waiting for tools?

(5) What is cost of idle time due to inconvenient lockers, toilets, drinking fountains, eating facilities?

(6) Have you had a scientific time and motion study made of worker's operations? (a) How recently?; (b) Have you increased production per man-hour this year over last? 1942? or 1941?

(7) Have individual and department performance standards been determined? (a) On a scientific and equitable basis?

(8) Is productive time of worker properly controlled?

(9) Have machine capacities been determined and recorded? (a) Are machines being worked to capacity?; (b) Could capacities of any individual machines be increased by minor adjustments or alterations?

(10) Have you had an analysis made of grouping machines for the needs of the product to cut time between operations?

(11) Have you charts and sheets detailing operations, sequence of operations and specifying equipment to be used? (a) Are alternatives indicated?; (b) Standard instructions for each operator?

(12) How is machine or work place capacity controlled?

(13) Have you a well systematized method of continuously scheduling and recording work ahead of department, work area and worker, to prevent idle time and co-ordinate needs in material, tools and facilities?

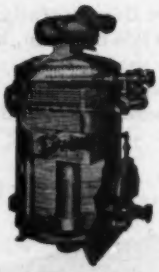
(14) Is down-time of machines excessive?

(15) Do you have a continuous recording of wasted machine time? (a) Any effort to *sell* waste machine time?

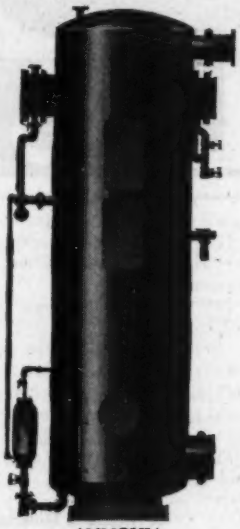
(16) Could waste time between operations be cut down by better transportation facilities within plant?

(17) Have you analyzed material storage conditions, raw materials, processed material, finished parts and products which

DEGASIFICATION OF WATER



OXYGEN *from* BOILER FEED WATER (*Tray Type*)



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THE removal of gases such as oxygen, carbon dioxide, hydrogen sulphide and ammonia, has been necessary in order to prevent deterioration of piping and auxiliary equipment in power plants, as well as in industrial processes. In addition to this, many processes require the complete removal of oxygen and carbon dioxide for most effective operation.

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THE ORR FELT & BLANKET CO., PIQUA, OHIO
ORR FELTS

may cause wastes of time? (a) Better location, nearer production?; (b) Excess handling?; (c) Easily moved?; (d) Properly indexed for ease of finding?; (e) Authority fixed for issue of material?; (f) Movement of material to work place; properly timed and controlled?

(18) Any waste of time caused by lack of inspection? (a) Inspection after every operation where salvage could be effected and processing time saved?; (b) Have you adequate methods of reporting wastes of machine and man-hours applied to parts or assemblies later rejected?

(19) Do you have adequate system of preventive maintenance? (a) Responsibility fixed?; (b) Periodic inspection and repair?; (c) Properly reported?; (d) Machine and man-hours lost by breakdowns and repairs?

(20) *Adequate tool control?* (a) Responsibility fixed?; (b) Analysis for possible time loss through inadequate tool control? (c) Tool room equipped properly?; (d) Tool room kept neat and orderly?; (e) Tools kept properly sharpened?; (f) Tools standardized?; (g) Department for making tools and jigs?; (h) Hools assigned to work areas properly?; (i) Record of tools available?

(21) *Adequate designing and engineering department?* (a) Are company secrets, plans and specifications of product well recorded?; (b) Complete drawings of all products?; (c) Complete material lists of all products?; (d) Could parts going into manufacture be better standardized?; (e) Could odd shapes and sizes be eliminated?; (f) Products of slight variation which could be standardized as to materials and processing?; (g) Better interchangeability of manufactured parts?

(22) Could various operations be better standardized? (a) As to work methods?; (b) Arrangement of work areas?; (c) Motion-sequences?

(23) Have you analyzed new time-saving technological developments for feasible application to your manufacturing operations?—e.g., infrared lamps for drying of paint and other purposes.

(24) What is your total estimated waste due to: (a) Idle time of workers?; (b) Idle time of machines?; (c) Deliberate curtailment of production?; (d) Other factors enumerated in this section?

4. Waste of Productive Energy

(1) Have you had scientific study made of worker's methods: (a) To eliminate unnecessarily tiring motions and fatiguing routine?; (b) To provide adequate facilities to save worker's energy?; (c) To prevent excess bending and motion due to poor arrangement of material and parts boxes?; (d) To determine whether traveling belts or automatic conveyances save worker's energy?

(2) Adequate tests for physical condition to stand tiring and fatiguing operations? (a) To determine emotional adjustment to requirements of job?

(3) Any dust or fumes which sap worker's energy?

(4) Inadequate light causing strain?

(5) Inadequate ventilation?

(6) Insufficient rest periods.

(7) Unharmonious working conditions? (a) Thoughtless actions and attitudes of foremen?

(8) Badly functioning machines or tools?

(9) False economy in poor material?

(10) Unnecessary noise?

(11) Undue accident hazard?

(12) Needless monotony?

(13) Waste of energy on line shafts?

(14) Are motors of right capacity for load assigned?

5. Waste of Materials

(1) Adequate reports of scrap and rejects? (a) Fullest possible salvage?; (b) Determination of causes?; (c) Responsibility properly fixed?

(2) Waste in material due to improper storage?

(3) Waste due to excessive cuts? (a) Oversize stock used?

(4) Waste caused by poor workmanship?

(5) Waste due to poor handling methods?

(6) Waste resulting from poor condition of machines, tools and equipment?

(7) Waste caused by overloading of machines?

(8) Waste due to working to unnecessarily close limits and tolerances?

(9) Waste resulting from poor training methods?

(10) Waste due to poor inspection? (a) Inspectors capable? (b) Inspection of

(Concluded on page 498)

POWER PLANT
Ref: Power Plant Cleaning Handbook

USE	PRODUCT
SCALE REMOVAL	
Heat Exchangers, Condensers, Evaporators	D-SCALE-R
Oil-Coolers	Oil side HEAVY DUTY CL. Water side D-SCALE-R
Oil Heaters	Oil side #75 Water side D-SCALE-R
Transformer Coils	HEAVY DUTY CL.
FEED WATER CONTROL ‡	
RUST & SCALE PREVENTION Boilers	BOILER PRESERVATIVE
SLUDGE CONTROL	
Governors (oil oper.)	METAFFIN
Oil Storage Tanks	CLEREX
Diesel Lube Oils	METAFFIN
Bearing Lube Oils, Turbines, Engines	METAFFIN
MAINTENANCE CLEANING	
Diesel Engine Parts	COLD TANK CL
Diesel Jackets & Cooling Systems	D-SCALE-R
Air Compressor Cyls.	55-P
PAINT STRIPPING	
Transformers	STRIPPER

H_2O FILTER PLANT
Ref: Paper Mill or Power Plant Cleaning Hdbk.

USE	PRODUCT
WATER STERILIZATION	PENETOX Z
PIPE MOSS REMOVAL	#61-X
SLIME REMOVAL	
Sand Filters, Piping	SLIME REMOVER B
SLIME CONTROL	HYDREX or PENETOX Z

WOOD MILL
Ref: Paper Mill Cleaning Handbook

USE	PRODUCT
PIPE MOSS REMOVAL	#61-X
SLIME REMOVAL	
Piping	SLIME REMOVER 4
SLIME CONTROL	HYDREX or PENETOX Z

PULP MILL
Ref: Paper Mill Cleaning Hdbk.
SULPHITE • SODA • KRAFT • RAG

USE	PRODUCT
PITCH REMOVAL	
Screens, Washers	SLIME REMOVER 10
RAG BOILING	BEATEX
SCALE REMOVAL	
Evaporators, *Steam side*	D-SCALE-R
Acid Heaters, *Steam side*	D-SCALE-R
PAINT STRIPPING	
Digesters	STRIPPER
PIPE MOSS REMOVAL	#61-X
SLIME REMOVAL	
Piping, Flat Screens, Washers	SLIME REMOVER 4
SLIME CONTROL	HYDREX or PENETOX Z

Black numerals beside products designate page in handbook ref. in column heading.

‡ Use during wash-up.

A • FELTEX—Solution has pH of 10+. For average felt cleaning during shut-downs.

B • NX or HYDREX—Solution is neutral. For use where conditioning during operation is required.

C • SAPONEX B1—Solution is colorless, odorless, slightly alkaline. For special uses requiring these qualities. Use during operation.

D • FELT CLEANER—Solution is slightly alkaline. For felts where certain types of filler and pigments require it. Use during shut-down.

Z • Solution toxic—Must not be taken internally.

‡ Address inquiries to WATER TREATMENT DIVISION
Magnus Chemical Co., Inc.
Garwood, New Jersey

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Company, Inc.
Garwood, N. J.

Magnus PRODUCTS for the Pulp and Paper Indus

STOCK PREPARATION
Ref : Paper Mill Cleaning Handbook

USE	PRODUCT
STOCK QUALITY CONTROL:	
BEATERS Absorbent Papers Blotting Board Bristol Box Chip Wall Building Asbestos Flooring-Felt Base Roofing Felt-paper or rag Tissue Papers Carbon Facial Fruit Toilet Towel Wrapping Papers Bag Bogus Glassine Kraft Waxed	BEATEX [16] OR NX
WHITE WATER STERILIZATION	PENETOX [Z]
PIPE MOSS REMOVAL	#61-X
SLIME REMOVAL	
Beaters Jordans Piping Refiners	SLIME REMOVER [4]
Stock Chests & Boxes Stock Filters	SLIME REMOVER [4] OR SUCTION PRESS ROLL CLEANER [10]
SLIME CONTROL	HYDREX OR PENETOX [Z]

PAPER MAKING
WET END
Ref : Paper Mill Cleaning Handbook

USE	PRODUCT
PITCH REMOVAL Wire	PITCHEX [19]
SUCTION PRESS ROLLS Rubber Covered	SUCTION PRESS ROLL CLEANER [10]
ROT-PROOFING Felts	PENETOX [Z]
CLEANING & CONDITIONING Felts	FELTEX [A 11] NX or HYDREX [B 14] SAPONEX [C 14] B_1 [D 15] FELT CLEANER
Limed Felts	D-SCALE-R [9]
PIPE MOSS REMOVAL	#61-X
SLIME REMOVAL Piping Thickeners Head Boxes Screens Wire Suction Couch Rolls Couch Roll Chest	SLIME REMOVER [4]
SLIME CONTROL	HYDREX OR PENETOX [Z]

DRY END
Ref : Paper Mill Cleaning Handbook

USE	PRODUCT
CALENDAR SIZING OR COLORING	BEATEX
PREVENTION OF SIZE STICKING Size Press	#58 [21]
RUST PREVENTION & COOLANT Grinding Calendar Rolls	#1
CLEANING & CONDITIONING Felts	FELTEX [A 11] NX or HYDREX [B 14] SAPONEX [C 14] B_1 [D 15] FELT CLEANER
PITCH SPOTS REMOVAL Felts	PITCHEX [19]
SLUDGE CONTROL Dryer Bearings Lube Oil	METAFFIN

COATING
Ref: Paper Mill Cleani

USE	P
PREVENTION OF SIZE STICKING Size Rolls	}

MAINTENANCE CLEANING

USE	PRODUCT
Screen Plates "Frictions" Machines Parts Roller Shaft Boxes	MAGNUSOL [22]
Cement Floors	CEMENT CLEANER [25]
Painted Walls	55-P [25]
Windows, rough glass only	WINDOW CLEANER
Windows, clear Metal	METAL POLISH
Hands	HAND CLEANER [25]
Skin Protection	SKIN-GARD
Paint Stripping *Machinery* *Piping*	STRIPPER

SALVAGE CLEANING

USE	PRODUCT
Dismantled Parts *Normal Condition* *"Burned-in" Condition*	MAGNUSOL [25] COLD TANK CL.
Pipe Fittings	STRIPPER

DE-RUSTING

USE	PRODUCT
Heavy Rust *Machinery* *Piping* *Fittings* *Parts*	D-RUST-R
Light Rust *Tools*	SOLVO-RUST

RUST PREVENTION

USE	PRODUCT
Machinery Piping Fittings Parts *In Storage*	PROTECTOLINE

ustry

G MILL. Cleaning Handbook	FINIS Ref: Paper
PRODUCT	US
OF G } #58[21]	RUST PRE & COOL Cutter

aper Industry

ook	COATING MILL. Ref: Paper Mill Cleaning Handbook		FINISHI Ref: Paper Mill
CT	USE	PRODUCT	USE
X	PREVENTION OF SIZE STICKING Size Rolls } #58 [21]		RUST PREVENT & COOLING Cutter Kniv
A 11 B 18 REX C 14 B1 D 15 NER			
X [19]			
FIN			

ISHING ROOM
er Mill Cleaning Handbook

SE	PRODUCT
REVENTION LING r Knives	#1

OFFICES & BUILDINGS
Ref: Paper Mill Cleaning Handbook

USE	PRODUCT
MAINTENANCE CLEANING	
Cement Floors, Driveways	CEMENT CLEANER [25]
Wood Floors, Painted Walls, Linoleum, Woodwork, *Varnished*	55-P [25]
Steel Ladders, Steel Stairs, Steel Floors	MAGNUSOL
Windows, *Rough Glass only*	WINDOW CLEANER
Windows, Plate Glass, Metal, Mirrors	METAL POLISH
Lighting Equipm't, *Bulbs, Reflectors*	SAPONEX B1

PERSONNEL
Ref: Paper Mill Cleaning Handbook

USE	PRODUCT
CLEANING	
Hands	HAND CLEANER [35]
Skin Protection	SKIN-GARD

TRANSPORTATION EQUIPMENT
Ref: Fleet Cleaning Hdbk.
AUTOS · TRUCKS · TRACTORS

USE	PRODUCT
MAINTENANCE CLEANING	
Motor Blocks, Chassis	MAGNUSOL [3]
Body Washing	55-P [21] or NXL
Tar Removal	TAR REMOVER [26]
Bright Metal	METAL POLISH [26]
Radiator Cleaning	D-SCALE-R [31]
Parts Cleaning	#782 [14]
Internal Motor Cleaning	METAFFIN [9]

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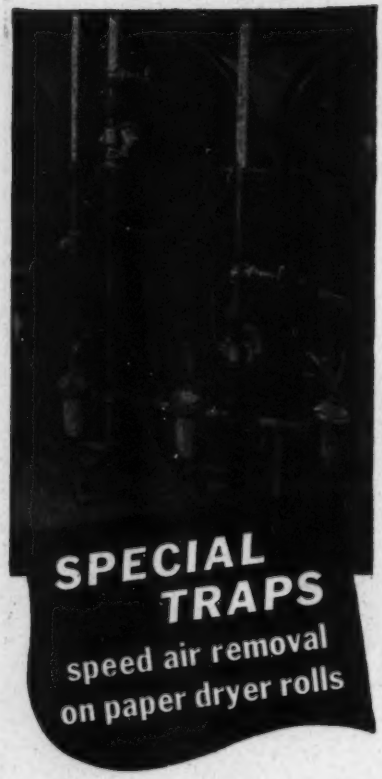

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816 Hoffman St., Three Rivers, Mich.

(Continued from page 490)

raw material? (c) Proper inspection standards? (d) Specifications of limits and tolerances?

(11) *Centralization of authority* and responsibility over quality and workmanship?

Accumulative experience in thousands of plants clearly proves that industrial wastes flow in these 225 well-defined channels — trickles which become torrents of wasted productive potentialities. Measurement and control of these wasteful factors must now be accomplished to spur production on to still greater heights and to overcome baffling problems of manpower and material shortages.

If management will get out of that all too common attitude of "Hmph that doesn't apply to my plant"—

If management, accepting the responsibility which lies squarely on its shoulders, will *initiate the action* to eliminate hidden wastes —

—then a 25 percent or more increase in production is positively attainable. In addition to going far to meet vital and immediate wartime exigencies, the postwar implications of such action have untold possibilities — possibilities that will be translated into new industrial successes of 194 (x).

Convention Papers . . . Abridged

This is the second installment of abridgemnts of papers presented at the annual meeting of The American Pulp and Paper Mill Superintendents Association, held in Chicago, May 24-26, 1944. More of these abridgments will appear in future issues.

Re-employment of War Veterans

LAWRENCE J. FENLON, Chairman
National Employment Committee
The American Legion

The American Legion in approaching the problem of the re-employment of those now serving in the Armed Forces has followed two creeds.

1. If America is to maintain a free society when Victory comes, that end can only be achieved here if we provide men with the means to be free, viz.—"jobs."

2. Veterans must not be penalized by their war service and the Nation as a whole must aid in helping them attain that position in civil life, upon their honorable discharge, which they normally should expect to have achieved if war service had not interrupted their careers.

The two main sources of employment that will be available to veterans are public employment and private employment.

The American Legion has presented to the Congress a definite legislative program giving to the war veteran a preference in appointment and retention in Federal Service. This Bill (H.R. 4115) known as the Starnes Bill, passed the House with but one dissenting vote and we expect it will be similarly emphatically approved by the Senate within a very short time.

In addition to this helpful measure, the American Legion as a result of our twenty-five years of experience in the field of veterans' rehabilitation, appreciated that the Government, in addition, was obligated to and should extend certain aid to the veterans of World War II in helping them regain their proper position in civilian life.

We, therefore, after lengthy study and after consultation with all authorities interested in the respective fields embraced, prepared an omnibus bill and presented it to the Congress. This bill to aid World War II veterans, (S. 1767) commonly known as The American Legion Bill of Rights, was introduced in the Senate with eighty-one senators named as co-sponsors. An unprecedented Senate sponsorship.

The Legion Bill of Rights guarantees to the returning World War II Veteran:

1. Prompt expansion of adequate hospital facilities.
2. Expeditious handling of claims for compensation.
3. Review of improper discharges after issuance.
4. Federally financed continuation of schooling and vocational training, with allowances.
5. Home, farm and small business loans.
6. Unemployment allowances.
7. An efficient veterans' employment service.
8. Administration of all services centered in the veterans' administration.

This Bill (S.1767) passed the Senate unanimously and we expect the principles will soon be enacted into law without material change.

The Government agencies concerned apparently in anticipation of the enactment of the Starnes Bill and the Legion Bill of Rights, have started to prepare to meet these obligations to the veterans as mandated by the Congress.

So much for the Government's obligation.

What about industry? What should it do and what is being done by certain elements of industry? What is the American Legion's attitude as to industry and the free enterprise system?

I will answer the last query by repeating the pronouncements of the American Legion's policy. In May, 1943, the National Employment Committee and the National Executive Committee and the National Commander in his address to the national convention at Omaha, stressed:

1. The American Legion's emphatic belief in a system of free enterprise, pledged to industry our assistance to this end and announced our opposition to the efforts of all persons in or out of Gov-

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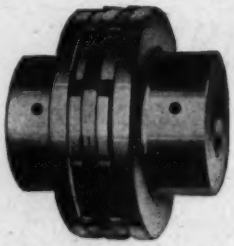

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ernment who seek to do away with a system of free enterprise.

2. Advocated that government control of business be restricted to necessary protection of the public and to employees so as to assure collective bargaining rights, and adequate and stable compensation for duties performed, sufficient to maintain American standards.

At the recent meeting of our National Executive Committee in Washington, D. C., on May 2, 1944, the following employment report of our Post War Planning Commission was unanimously approved:

Employment

"Postwar employment can best be fostered by a system of free enterprise, embodying the greatest encouragement to individual initiative and industrial leadership. A program of fair and equal treatment to both management and labor should be made effective:—each must be mindful not only of its privileges and rights, but also of its duties and responsibilities. Only in instances where it is absolutely necessary to relieve great hardship and suffering should taxpayers' money be spent to create employment, and then only on the soundest type of public works with local projects financed completely by local funds. American Legion Posts should take the lead in community job surveys to discover the maximum number of jobs for veterans. . . . "

What is industry's obligation to veterans?

The legal obligation, for re-employment, is provided in Section 8 of the Selective Training and Service Act of 1940, as amended. It is commonly recognized as time goes on that provision will require clarification and interpretation. I understand the Judge Advocate's Department is now preparing a detailed release as to the employer's obligation and the veterans' right under this Section.

Industry, however, cannot rest with merely meeting its *legal* obligation to re-employ the returning veterans. It must exert every effort to place the greatest possible number of veterans in industrial jobs. That can only be achieved by each company developing *now* a clearly defined and sound program, for that particular company, so as to facilitate and expedite the hiring, placement and satisfactory adjustment of veterans in suitable jobs.

The larger companies of the Nation, in the main, fortunately are making their plans along these lines. These large companies, however, do not employ the majority of the workers of the Nation. The smaller businesses provide the bulk of employment. It is to that group, that thought must be directed so as to stimulate thinking of the problem that is to come when "V" Day arrives.

The American Legion for the past decade has worked very closely with the National Association of Manufacturers, first in breaking down the unfounded prejudice that existed in the 30's as to the employment of workers over 40, and now as to the employment of veterans.

Under the able chairmanship of Harry L. Derby, president of the American Cyanamid and Chemical Corporation, the National Association of Manufacturers has established a committee on veteran employment problems.

The N. A. M. committee has recommended the adoption of a program that should provide maximum employment of veterans. While this program will be released primarily to the manufacturing industries members of the N. A. M., it is applicable to virtually every business and could well be followed by all.

The premise upon which the N. A. M. committee approaches the problem of veterans' employment is, as briefly expressed by Mr. Derby:

"Aside from the legal obligation involved, it is imperative that the returning veteran receive the proper reception when he returns for his old job. Management can do no less than give the veteran an enthusiastic welcome home — second only to that welcome he receives from his family."

The N. A. M. Committee on veterans' employment problems, has devised a checklist, for distribution to its members, to stimulate management's preliminary study and thorough analysis of the many in-plant, external, legal, social and human relations phases of the already present and evergrowing problem of veterans' employment.

This N. A. M. checklist is intended for

ONLY WORTHINGTON BUILDS 'EM ALL

The Right Pump in the Right Place for Every "Wood Conversion" Process

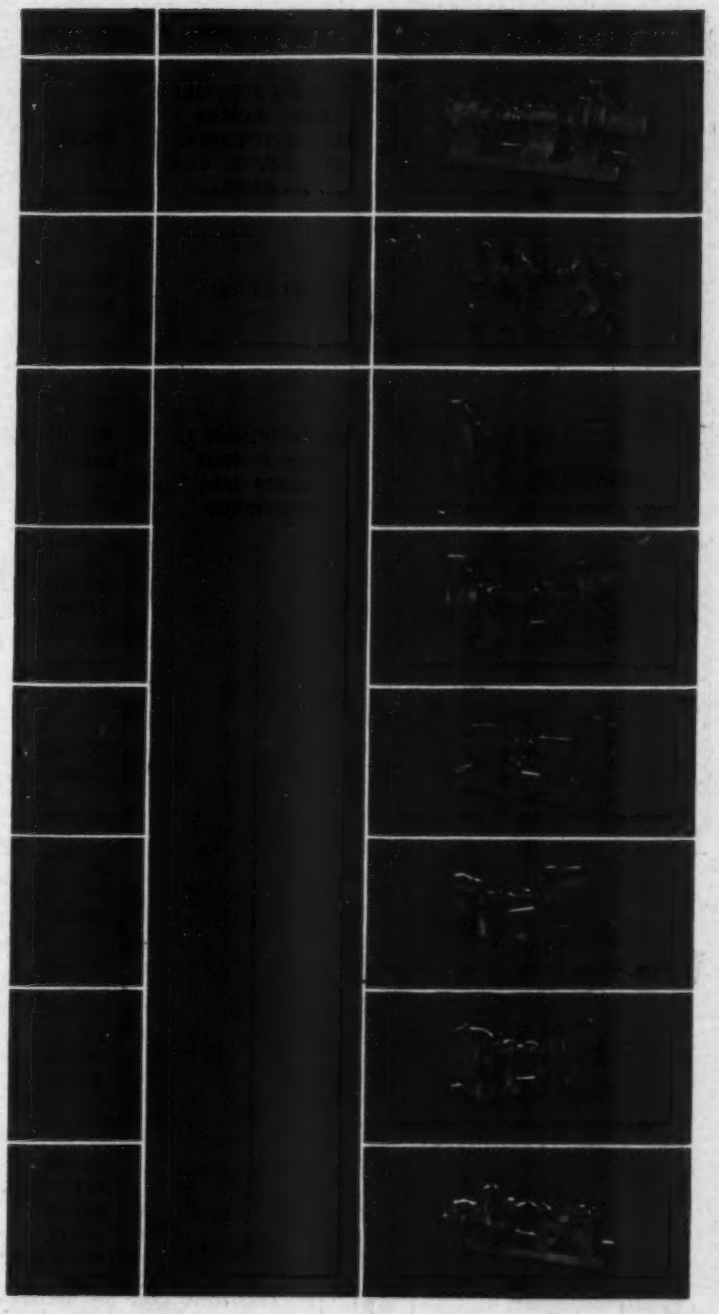
Here's why you find the right centrifugal pump for your needs when you come to Worthington.

1. Worthington offers the most complete line of sizes and types, which have been designed and adapted through the years to solve those pumping problems which you encounter in your mill.
2. Worthington brings the longest and broadest engineering experience to the solution of difficult or unusual pumping requirements.

Black liquor, for instance, the present and future source of many profitable by-products, defied pump engineers until Worthington developed the only pump that can now handle it with complete success.

If you are now considering *any* pump application, including the handling of corrosive, abrasive, hot, viscous, foamy or solidifying liquids — write us, using coupon below, or telephone the nearest of our 36 district offices.

Worthington Pump and Machinery Corporation, Harrison, N. J.



WORTHINGTON *BEHIND THE NAME* WORTHINGTON

Rotary

Steam

Turbine Well

WORLD'S LARGEST MANUFACTURER OF PUMPS

Power

Centrifugal

CP4-74

WORTHINGTON PUMP AND MACHINERY CORPORATION
Centrifugal Pump Division
Harrison, N. J.

My pumping problem is.....

.....

Name.....

Company.....

Address.....

.....

He profits most who serves best.

KALAMAZOO VEGETABLE PARCHMENT CO.

Parchment — Kalamazoo — Michigan

in-plant use by individual companies and is obviously designed to stimulate the fullest consideration of ways and means by which industry can provide maximum employment for veterans.

The checklist, a two-page folder, is divided into the following six subheads:

1. Preliminary preparation
2. Employers' legal obligation under Section 8 of the Selective Service Law
3. Veterans' legal rights and restrictions
4. Seniority problems
5. Company program for veteran employment
6. Program for the employment of disabled and handicapped veterans

I would recommend to your Association the adoption of a similar checklist for distribution to your members.

Considering that the mechanized War we are now engaged in will enable the members of our Armed Forces to acquire skills that will be most useful to industry upon their return, coupled with the educational and vocational training opportunities to be afforded veterans of World War II under the American Legion's Bill of Rights, it is obvious the returning veteran if judiciously placed, will be a decided asset to any employer. Industry must therefore be ready to receive these veterans and capitalize, for their mutual benefit, upon these newly acquired or improved skills.

One of the important problems that industry must face is the full use of the services of the physically handicapped or disabled veteran. We of the Legion, in their name, beg of you, give them a break —jobs, not sympathy—when they come home.

We fully realize that unfortunately too many employers have displayed an unfavorable attitude toward the employment of the physically handicapped. Some have indicated that their attitude was caused by pressure from their insurance companies.

Our investigation shows that the insurance companies approve rather than oppose the employment of the physically handicapped.

With honest thought directed to the employment of the disabled or physically handicapped veteran, with unfounded prejudices eradicated, industry will find itself the beneficiary of a source of loyal employees that will return dividends in more ways than one.

WPB and the Paper Industry

ALLAN HYER, Chief
Distribution Section Paper Division

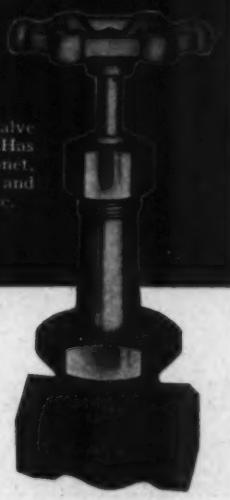
Our entrance into the war two and a half years ago, found the paper mills completing the most successful production year in history. Little thought was given then to paper or paperboard as war materials; furthermore, they were plentiful.

The first impact against the paper mills came with the restrictions on the use of steel, copper and other metals. This meant the substitution of other materials for certain operating supplies and repairs and brought with it the first need for adjustment to war conditions. The scarcity of

NO "Global Strategy" NEEDED

with POWELL Engineering at your service ....

Fig. 375 Bronze Gate Valve for 200 pounds W. P. Has screwed ends, union bonnet, inside screw rising stem and a special hard bronze disc.



Guessing and gazing are out when it comes to buying your flow control equipment. Because, for even the simplest operation, the valve must be of correct design to obtain maximum efficiency. This not only includes basic type, such as Globe, Angle, Gate, "Y", Check, Relief and Non-Return, but such factors as suitable stem action, bonnet construction, working pressure and especially the materials used in the body and mountings. Thus, for certain services, an all iron valve is not only entirely adequate but most economical. But in many cases bronze, steel, pure metals or even special alloys are indicated. POWELL *makes them all.* And to assist you in selecting the correct valves to meet your individual requirements, POWELL maintains a staff of engineering experts who are always at your service for consultation and advice.

Fig. 500—Bronze Gate Valve for 125 pounds W. P. Has screwed ends, screwed-in bonnet and inside screw rising stem. Sizes ¾" and smaller are equipped with taper wedge solid disc; sizes 1" and larger, with taper wedge double disc.

Fig. 1708—Bronze Globe Valve for 200 pounds W. P. Has screwed ends, union bonnet, renewable seat and regrindable, renewable hard bronze semi-cone plug type disc. This valve is especially suitable for throttling service.

The Wm. Powell Co.

Dependable Valves Since 1846

Cincinnati 22, Ohio

POWELL VALVES

MISCO 'C'

The Corrosion Resistant Alloy

CAST • ROLLED • FABRICATED

is best for

Digester Neck Rings • Blow-off Valves
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Strainers • Fittings • Acid Pumps • Piping
and all other
equipment exposed to corrosion by sulphite acids

MICHIGAN STEEL CASTING COMPANY *1999 Guoin Street* **DETROIT 7, MICHIGAN**

MISCO
Heat and Corrosion Resistant Alloys

One of the World's Pioneer Producers of Chromium-Nickel Alloy Castings

metals was followed shortly by a curtailment of chemicals and the art of papermaking was beginning to have a new meaning. But other industries were changing, too. In Consumers Durable Goods, plants that had been manufacturing refrigerators, typewriters, radios, electrical appliances and many other similar items, were converting to the production of small arms, shells, parts for planes and tanks. As a result, there was a decline in demand for paper and paperboard that drove the production curve to a dangerously low level in the late summer of 1942. There was talk of concentration, a move that would have closed many mills in the interest of releasing labor and conserving materials and transportation. Fortunately, for the mills, and for the war program, this action was discouraged and events that followed were to prove that paper and paperboard, almost overlooked in the tremendous drive to build the tools for fighting men, were themselves to become the most important weapons of all.

Early in the year 1942, it was apparent that the normal supply of pulpwood could not be maintained against the loss of imports, the desertion of labor from the woods for the more lucrative jobs in shipyards and industry, and the accelerated draft. The allocation of pulp became a necessity. This timely action has been the principal reason for the continued operation of all mills and a guarantee for the production of the essential military and civilian requirements.

As the running time in the mills continued to drop off, it became imperative that the industry turn its attention to new products — products that would fit into the war program. With this in mind, the Paper Division set up a War Products Development Section, staffed by several of the best technical men in the industry. The results were immediate and, to many, amazing. Contacts with the Ordnance and Quartermaster departmens of the Army disclosed that paper and paperboard were the only available substitutes for steel, copper, glass, and lumber; and, in many cases, the best materials suitable for certain purposes. Technical research and development were at the peak and the effect was soon noticeable on the production lines; from V-boxes to V-mail, the array of new products was an impressive one. Adding to these the growing demand for industrial papers, such as towels, tabulating cards, tags, carbonizing tissues and many others, and again you had a full order book.

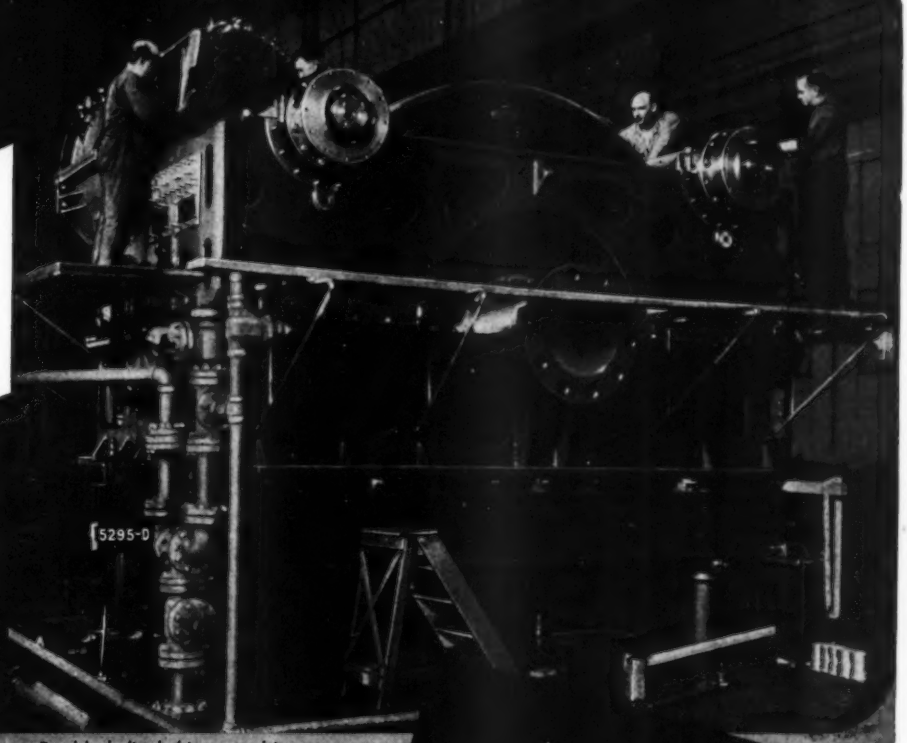
The effect of these changes was salutary. It is not enough to speak of it as a comeback; it was more of a belated recognition of a product that had been taken for granted, as Mr. Donald Nelson once expressed it, and had now proved its essentiality.

In the summer of 1943, the Pulpwood Section of the Paper Division was expanded and given new powers to cope with the toughest job in the industry. The first move was the appointment of an area representative in each of the woods sections. All were experienced woods operators who knew what had to be done and how to do it. But the doing was not so easy. Logging crews aren't found on street corners and the only prospect appeared to be prisoners of war. After many weeks of planning, camps were started until now, there are almost 10,000 men — prisoners of war — working under the supervision of the Army; and the wood is beginning to move.

Next to labor, the most important item in the woods is equipment. Almost 90% of all pulpwood in this country is handled by trucks and tractors. With 85% of the trucks and tractors going to the Army, the pulpwood producers have performed miracles in keeping the old equipment in use. Power saws and homemade loading rigs have played an important part and an educational campaign on the use of more labor saving equipment is now under way in each area. Many new barking drums of all types have been put into production in the past few months, especially where peeled wood is not obtainable. You can be sure that if it's humanly possible, you will get more wood. The best news of the week is the release of 32,000,000 board feet of logs from Canada for shipment to our own pulp mills.

Wastepaper has now become an aristocrat among the raw materials for papermaking. Nearly 70% of all mills are using wastepaper — twice as many as before the war. Collections are improving each week as a result of the intensive campaign, but it is another case of the more you get, the more you need. The largest users of this material, the paperboard container mills, are looking at a demand that is almost unbelievable and the realization that our supplies to the war zones will bog down if we

PARTS ARE GAGED *before and after* THE TEST RUN



Double helical ship propulsion gear on test floor at the De Laval Works

In the De Laval Works each part of a machine is manufactured to limit gages on an interchangeable basis and then, after assembly, the complete pump, compressor, steam turbine or gear is tested under operating conditions to make sure that performance guarantees are met and that the unit is mechanically perfect.

Following the test, the machine is taken down and the parts carefully scrutinized and gaged again, in order to detect any deviation from normal. This practice and policy insures that the purchaser will in every instance receive a correctly built and perfectly operating machine.

M-30

De Laval STEAM TURBINE CO.
TRENTON 2, N.J.

MANUFACTURERS OF TURBINES... STEAM, HYDRAULIC; PUMPS... CENTRIFUGAL, CLOGLESS, ROTARY DISPLACEMENT, MOTOR-MOUNTED, MIXED-FLOW, PROPELLER; PRIMING SYSTEMS; CENTRIFUGAL BLOWERS and COMPRESSORS; GEARS... WORM, HELICAL, and FLEXIBLE COUPLINGS

It's the encore that counts

CLARK ELECTRIC Fork Trucks
ARE BACK . . . AND AVAILABLE

Concentrated effort on production of gas powered fork trucks for our Armed Forces curtailed the manufacture of *Clark Electric Fork Trucks* for a short time.

Increased productive capacity enables us to again serve the needs of Industry for dependable and proven electric fork trucks.

CLARK ENGINEERED and CLARK BUILT

If you need an electric fork truck NOW, phone, wire or write.

CLARK TRUCTRACTOR
DIVISION OF CLARK EQUIPMENT COMPANY
BATTLE CREEK, MICHIGAN, U.S.A.

don't make it, doesn't leave a very happy thought to take to bed with you. A new Order, M-377, gives authority to the War Production Board to issue directives for the delivery of wastepaper at ceiling prices to consumers needing it for essential purposes.

The basis weights you are using under Order L-120 have not brought any happiness to your operating departments but they have extended the use of pulp to give more yardage to cheer up the consumers who must have more and more for essential purposes.

There was a time when certain recognized claimants had difficulty obtaining their requirements. In some mills these orders were accepted willingly, but an occasional refusal from others often resulted in a delay of some very necessary program. Consequently, M-24 became necessary, better known as the reserve production order. The issuance of a directive against your production is governed entirely by your cooperation in the manufacture of the most essential grades. They are not always the easiest orders or the ones you want to make, but under M-241 the responsibility for making them is shared by all.

One of your most serious problems from the very beginning has been the upkeep of your mill equipment. Anyone familiar with the conditions under which you have operated for more than two years must, in fairness, pay some compliment to the ingenuity and resourcefulness of your mechanical departments during a production period that has far exceeded anything you have ever done before. Since the suspension of the manufacture of paper mill machinery in April, 1942, your machinery industry has averaged as high as 85 to 90% on direct war work leaving little more than enough capacity to carry on your necessary repair programs. But fortunately some relief is now available.

The importance of maintaining paper production made it possible for us to obtain a grant of materials starting with the second quarter to be used in the manufacture of paper mill machinery. It has been allowed as a special recognition of the need, not as part of a reconversion program. The amount released is considerably more than we have had in a good many months, but still not enough to satisfy all of your requirements, which means that you will receive according to your capacity to give — machinery will be bartered for essential production.

Coincident with the release of more material, Order L-83 was amended as of April 20, 1944, with changes that should be beneficial. Probably the most important change was in the application form itself. You are now required to file on Form WPB-1319, and where the dollar value is $2,500 or greater, your applications are mailed directly to the Paper Division in Washington, and in most cases will be processed and returned to you in one day. For cases that have a dollar value of less than $2,500, you will file on the same form with the nearest District Office of the War Production Board. In the new order, it is permissible to use your MRO ratings for repairs, maintenance and operating supplies up to the value of $2,000 instead of $1,000 as before. This refers to all repair and maintenance parts, but where the amount is greater than $2,000, you must file on Form WPB-1319.

It is still possible for you to obtain capital goods items up to $500 with an MRO rating, as provided in CMP Regulation 5.

As a result of the new equipment program, applications totaling almost $3,000,000 have been approved since March 1 and for lack of complete information and failure to establish the immediate necessity, a similar amount has been denied. Some of these cases are held in our file until others of greater importance have been scheduled. It is always your privilege to file a new application for reconsideration.

In spite of the scarcity of materials and the various regulations, the paper industry is really doing a good job. It should be encouraging to you to know that your affairs are handled by your own representatives. Those writing the orders, allocating materials, issuing directives, are from your own industry. The directors of the Paper and Paperboard Divisions are well known to all of you. Each has a prodigious capacity for work and each is endowed with the ability and leadership necessary to their responsibilities. They have their sights trained directly on the two things that are most important: First, to provide the paper and paperboard production necessary to win the war and, second, to maintain the high standards of the industry as consistently as possible with the first. These purposes are reflected throughout the entire personnel of the two divisions.

THEY *keep rolling*

ON WARREN PUMPS

If all the hours that SKF Bearings have served on paper stock pumps were added together, the result would be impressive. It is significant, therefore, that the bearings on this Warren Pump are SKF's. An SKF Self-Aligning Ball Bearing on the impeller end takes radial loads while on the coupling end, an SKF Double-Row Deep Groove Ball Bearing accepts various combinations of radial and thrust loads. As a result, there's continuous smooth running, low maintenance costs, no adjustments—a few of the many advantages that enable SKF's to keep pumps on the job 60 minutes an hour, 168 hours a week, 52 weeks in the year. 3600

SKF INDUSTRIES, INC., PHILADELPHIA 34, PA.

SKF - EQUIPPED

Pumps

Built by
Warren Steam Pump Co., Inc.

VALVES VALVES VALVES VALVES VALVES VALVES

BUT ONLY HILLS-McCANNA VALVES STAND OUT FOR THEIR COMPLETE FREEDOM FROM OLD-STYLE VALVE FAILURES!

Yes, this Hills-McCanna Diaphragm Valve is so different from ordinary globe and gate valves and plug cocks, both in design and in performance, that it actually initiated a new era in valve practice.

The diaphragm principle, as perfected by Hills-McCanna engineers over 12 years of application, at one stroke, eliminated all the many common valve troubles such as wear, corrosion, clogging, sticking, leaks, drips, failures.

The design *completely* separates all valve working parts from the fluid—no contact, hence, nothing to be eaten away—no reseating or regrinding to worry about. Diaphragm hugs seat tight—permits tight closure even over settled matter.

Use this valve for your stock lines, alum solutions, hypochlorite, chlorinated water, air, liquor, caustic lines, or oxygen and acetylene gases, etc.

Streamlined Flow

—no pockets or ports to clog or reduce pressure. Write for Catalog V-41 . . . it's an eye-opener on modern valve practice.

HILLS-McCANNA SAUNDERS PATENT DIAPHRAGM VALVES

Hills-McCanna have pioneered this valve in the United States since 1932, and therefore offer users extensive application experience. Consult us on your valve problems.

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Yet in the final analysis, the job is not the responsibility of any one group, government or otherwise. It goes back to that same old teamwork we've heard about so many times.

There is plenty left to do and especially in the paper industry. We cannot afford to minimize the importance of anything or relax our individual efforts.

When the allocation of pulp is inadequate, when the directives seem to ask the impossible, and when your applications are denied, keep in mind that it is all for the best interests of G. I. Joe — to keep him in a position to score when the right time comes. His is the really big job and he is the one we are working for.

The Functions of a Labor-Management Committee

H. M. K. GRYLLS*

I have read and have been told a great deal about the organization and functions of Labor-Management Committees. Undoubtedly most of the information which I have thus assimilated is true, but inasmuch as we believe that we have achieved signal success with our own Labor-Management Committee, through the development of our own ideas as to how it should function, I am going to stick pretty well to our own experience and tell you the steps by which our committee was created, enlarged, and under what principles it functions, discussing, as proof of its success, some outstanding results it has achieved.

The East Chicago, Indiana, works of the Grasselli Chemicals Department of the du Pont Company manufactures acids and heavy chemicals. Approximately 80% of our production goes either directly or indirectly into the support of the war effort. We have about 800 employees of whom 150 are occupied with supervisory, administrative and clerical duties, and the balance comprises the manufacturing and maintenance wage roll. Approximately 20% of our wage employees are colored and approximately 11% are women. We generate our own power, both for process and utility.

Our Labor-Management Committee was formed on April 7, 1942, and consisted of six members, three appointed by the Grasselli Employees Independent Association of East Chicago, Inc., the employees' union which we have recognized as the exclusive bargaining agency for all employees, and three by the works management. The three members appointed by the union were the president of the union, a first class operator from the manufacturing group, and a first class electrician from the maintenance group. The works management appointed the assistant works manager, the assistant works engineer and the works safety supervisor. At the first meeting of the committee the assistant works manager was elected chairman and the first class operator, secretary. You can see from the type of men selected for membership on the Labor-Management Committee that the importance of the potential value of the committee was appreciated by both labor and management.

Because Labor-Management Committees were conceived, developed and perfected by the War Production Board, it is only natural to assume that the prime purpose of these committees was to increase production of essential commodities and maintain this increased production for the duration. Therefore, at the first meeting of our committee, we set up subcommittees considered essential to the promotion of production and selected as chairmen and vice chairmen for these subcommittees men who would really pitch in and work. Naturally, the first subcommittee considered was the subcommittee on production. The chairman and vice chairman of this subcommittee were very carefully selected, as we wanted men in these positions who understood operating problems, personnel matters, maintenance and general technology of operation, so that they could select a subcommittee which, either as a whole or individually, could cope with any difficult manufacturing problem interfering with a desired increase in production.

Next we considered the activities on the plant which bore the closest relation to production and created subcommittees to handle each one of these activities.

We considered these to be:

(1) Employment; because in order to produce, you must have the necessary personnel for the operation of process, and Selective Service and competitive employment were difficult factors to combat.

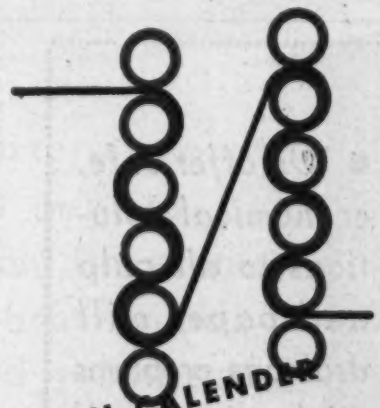
(*) Assistant to the Works Manager, Chairman of the Labor-Management Committee, E. I. du Pont de Nemours & Co., Grasselli Chemicals Department, East Chicago, Indiana.

PARACOL*

WAX EMULSIONS ...EASY TO USE

...IN BEATER

...IN TUB



...ON CALENDER

...IN COATER

The versatile Paracol* Wax Emulsions mix perfectly with all papermaking materials . . . they may be applied in beater, tub, calender or coater. They deposit the wax where it's needed . . . when it's needed . . . in exactly the right amounts . . . and *uniformly* because the emulsified wax particles are microscopically small.

Your PMC technical representative knows how to help you obtain the best results with Paracol—through our more than 15 years experience in making emulsions and applying them to papermaking problems. For further information on the use of Paracol emulsions in your operations, use the convenient coupon below.

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CHEMICALS FOR INDUSTRY

HERCULES POWDER COMPANY
INCORPORATED

Paper Makers Chemical Department,
962 Market Street, Wilmington 99, Delaware

Gentlemen:

My wax problem is.....

Please send me information on.....

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Firm.....

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* Reg. U. S. Pat. Office by Hercules Powder Company

PI-45

You Paper Mill Men • *take a Tip on Kalamazoo Tile Stock Tanks and Chests* • *you can't beat them for* **STRENGTH** *and* **DURABILITY** •

Kalamazoo Vitrified Glazed Tile *is a "Natural" for Paper Mill needs*

Smooth, hard, strong, easily cleaned and highly resistant to chemical action, this marvelous vitrified glazed tile type of construction is preferred by scores of leading paper mill executives and engineers. Adaptable for stock tanks and chests of all kinds. Costs no more than concrete tanks that require constant maintenance expense. . . . An exclusive method of glazed tile tank construction developed by Kalamazoo engineers. It provides greater flexibility and lower cost for all paper mill stock handling problems. Immediately available.

● **Any Size or Shape Desired—**

Wide, narrow—shallow or deep. Round, rectangular or square. Half-round or tapered bottom and corners. Midfeathers and fins where needed to control stock flow. Adaptable to pumps or agitators. Construction individually designed to meet space, tonnage or production requirements.

Ask for engineering data.

Kalamazoo TANK & SILO CO
KALAMAZOO - MICHIGAN

● *We offer safe, economical solutions to all pulp and paper mill drainage problems with our twill weave, plain weave, sewed seam, and soldered seam wires.*

INTERNATIONAL WIRE WORKS

MENASHA, WISCONSIN

(2) Transportation; because after you have the employees you have to see that facilities are provided to get them to and from work, and gasoline, tires, and bus schedules were matters which were daily becoming more and more involved.

(3) Attendance; because after you make arrangements to get your employees to work, you have to keep them on the job and cure any tendency towards absenteeism before the disease assumes a chronic nature.

(4) Safety and Health; because after you have employed the necessary personnel, provided facilities to get them to and from work, checked up on their absences, you have to keep them well and see that they work safely in order to keep them on the job.

(5) Plant protection; because you cannot take a chance on losing the facilities with which you produce, after you have provided the personnel with which to produce.

(6) Employees Suggestions; because there are always so many better ways of doing things and the man on the job is in a much better position to appreciate the possibilities for improved methods.

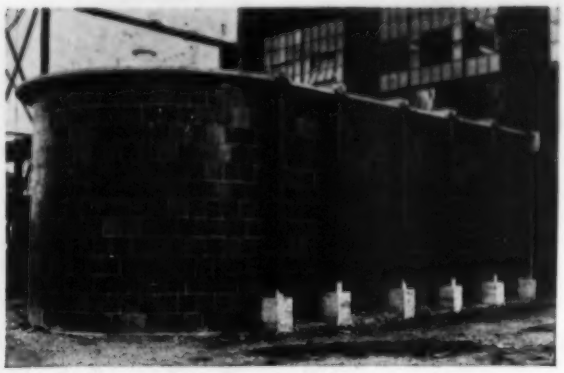
Thus, we found ourselves with seven subcommittees, the six defined above, and, in addition, the subcommittee on production. As the work of the committee proceeded, additional subcommittees were created as the need arose.

It was seen that some method must be devised to carry the work of our committee and the results obtained back to the employees. Also to handle the various types of publicity essential to the proper functioning of such a committee. Therefore, a subcommittee on publicity was created.

The average chemical plant of any age contains a large number of wooden buildings, as, before the production of certain corrosion resistant materials, wood was found to have by far the best resistance to deterioration. As a result, the fire hazard in a chemical plant is above the average, and realizing the possibility of bombing with the use of incendiary bombs, a subcommittee on fire protection was created. As chairman of this committee, we selected the fire chief as we already had a well organized intraplant fire fighting organization. The work of the existing organization was supplemented by additional inspections, instruction on different types of bombs and how to handle them and a very direct tie-in with local municipal fire fighting facilities was developed.

As material became harder and harder to obtain, it was necessary to use the utmost ingenuity at times to repair equipment and keep it in operating condition. We began to get thrifty in the salvage of repair parts and in order to assist in preventing interruption to operations through equipment failure, subcommittees on maintenance and repair and on waste elimination were created. The maintenance and repair subcommittee interested itself in finding better ways of doing repair jobs, of substituting materials for those we were unable to obtain, and instituted a more intense system of periodical inspection to prevent

You Paper Mill Men • *take a Tip on Kalamazoo Tile Stock Tanks and Chests* • *you can't beat them for* **STRENGTH** *and* **DURABILITY** •



Kalamazoo Vitrified Glazed Tile *is a "Natural" for Paper Mill needs*

Smooth, hard, strong, easily cleaned and highly resistant to chemical action, this marvelous vitrified glazed tile type of construction is preferred by scores of leading paper mill executives and engineers. Adaptable for stock tanks and chests of all kinds. Costs no more than concrete tanks that require constant maintenance expense. . . . An exclusive method of glazed tile tank construction developed by Kalamazoo engineers. It provides greater flexibility and lower cost for all paper mill stock handling problems. Immediately available.

• **Any Size or Shape Desired—**

Wide, narrow—shallow or deep. Round, rectangular or square. Half-round or tapered bottom and corners. Midfeathers and fins where needed to control stock flow. Adaptable to pumps or agitators. Construction individually designed to meet space, tonnage or production requirements.

Ask for engineering data.

Kalamazoo TANK & SILO CO
KALAMAZOO - MICHIGAN

• *We offer safe, economical solutions to all pulp and paper mill drainage problems with our twill weave, plain weave, sewed seam, and soldered seam wires.*

INTERNATIONAL WIRE WORKS

MENASHA, WISCONSIN

(2) Transportation; because after you have the employees you have to see that facilities are provided to get them to and from work, and gasoline, tires, and bus schedules were matters which were daily becoming more and more involved.

(3) Attendance; because after you make arrangements to get your employees to work, you have to keep them on the job and cure any tendency towards absenteeism before the disease assumes a chronic nature.

(4) Safety and Health; because after you have employed the necessary personnel, provided facilities to get them to and from work, checked up on their absences, you have to keep them well and see that they work safely in order to keep them on the job.

(5) Plant protection; because you cannot take a chance on losing the facilities with which you produce, after you have provided the personnel with which to produce.

(6) Employees Suggestions; because there are always so many better ways of doing things and the man on the job is in a much better position to appreciate the possibilities for improved methods.

Thus, we found ourselves with seven subcommittees, the six defined above, and, in addition, the subcommittee on production. As the work of the committee proceeded, additional subcommittees were created as the need arose.

It was seen that some method must be devised to carry the work of our committee and the results obtained back to the employees. Also to handle the various types of publicity essential to the proper functioning of such a committee. Therefore, a subcommittee on publicity was created.

The average chemical plant of any age contains a large number of wooden buildings, as, before the production of certain corrosion resistant materials, wood was found to have by far the best resistance to deterioration. As a result, the fire hazard in a chemical plant is above the average, and realizing the possibility of bombing with the use of incendiary bombs, a subcommittee on fire protection was created. As chairman of this committee, we selected the fire chief as we already had a well organized intraplant fire fighting organization. The work of the existing organization was supplemented by additional inspections, instruction on different types of bombs and how to handle them and a very direct tie-in with local municipal fire fighting facilities was developed.

As material became harder and harder to obtain, it was necessary to use the utmost ingenuity at times to repair equipment and keep it in operating condition. We began to get thrifty in the salvage of repair parts and in order to assist in preventing interruption to operations through equipment failure, subcommittees on maintenance and repair and on waste elimination were created. The maintenance and repair subcommittee interested itself in finding better ways of doing repair jobs, of substituting materials for those we were unable to obtain, and instituted a more intense system of periodical inspection to prevent

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failures, rather than to cure them after occurrence. The waste elimination subcommittee worked hand in hand with this subcommittee by salvaging material which previously had been discarded, observing wasteful activities both conditions and practices, throughout the plant, reporting them and having them corrected. One of the major duties of this committee became the salvage of scrap paper.

About that time a War Bond campaign was being promoted so we established a subcommittee on War Bonds, whose job it was to obtain at least 10% of an employee's earnings from 100% of the employees. This committee has been very successful in maintaining this ratio, even during the present difficult times of high labor turnover.

When the labor situation became acute and we saw that satisfactory male labor was practically out of the question, we began to employ women. This was a practice to which we had not resorted since the last war, and as the number of women employees increased, it became evident that some agency should be created to handle the little difficulties which arose through lack of provision of comfortable facilities and the smoothing over of all the little frictions which developed from unintentional indiscretions. The committee, therefore, created a subcommittee called the woman's advisory committee and appointed as chairman the woman's counselor, a new position created when the decision was made to employ female labor. This committee has been particularly successful in straightening out minor misunderstandings and in arranging the provision of satisfactory facilities. The membership of the committee is carefully spread throughout the works so that its discussions are representative of the ideas of the entire female personnel. This is important in this type of committee.

Recently we were advised that the prospect of feeding the American people in the coming winter was not very rosy, but that one of the best methods of putting a little color into the situation was the promotion of Victory gardens. Our employees have always maintained Victory gardens, but purely from a personal desire. Realizing that probably many employes who could maintain a Victory garden were not doing so, we appointed a subcommittee on Victory gardens. It was the duty of this committee to get behind the idea and promote it for those employees who were not particularly interested or who did not think it was necessary. This committee has done a splendid job, over 300 of our employees at the present time having Victory gardens under actual cultivation.

For many years, the plant has had an athletic association which promotes athletic activities and social functions for the enjoyment of our employees. It is practically self-supporting. It is a decided morale builder and its activities are enjoyed by a large percentage of our employees. As a matter of policy, we included the activities of this association under the direction of a subcommittee on athletic association affairs, making the president of the association, the chairman, the vice president the vice chairman, and the board of directors members of the committee. In this manner, the Labor-Management Committee is constantly in touch with the activities of the athletic association.

This comprises our setup to date: namely, a Labor-Management Committee of six members and 15 subcommittees, each subcommittee headed up by a chairman and vice chairman with sufficient committee members to conduct the committee business. In all, the 15 subcommittees involve 119 employees. Each member of the Labor-Management Committee is assigned certain subcommittees, the activities of which he is to supervise. At each monthly meeting of the Labor-Management Committee, the reports of the activities of the subcommittees forwarded by the chairmen to the member of the Labor-Management Committee supervising that particular subcommittee, are read and considered. A very definite attempt is made to avoid unfinished business as it is our belief that one of the reasons for our success is the quick attention given matters submitted by the subcommittees for consideration by the main committee.

While the results obtained by each of the various subcommittees have been outstanding individually, I think that the success of the Labor-Management Committee idea can best be summarized by the increased production of essential products we have obtained.

There are twenty-two producing departments at the East Chicago Works. This

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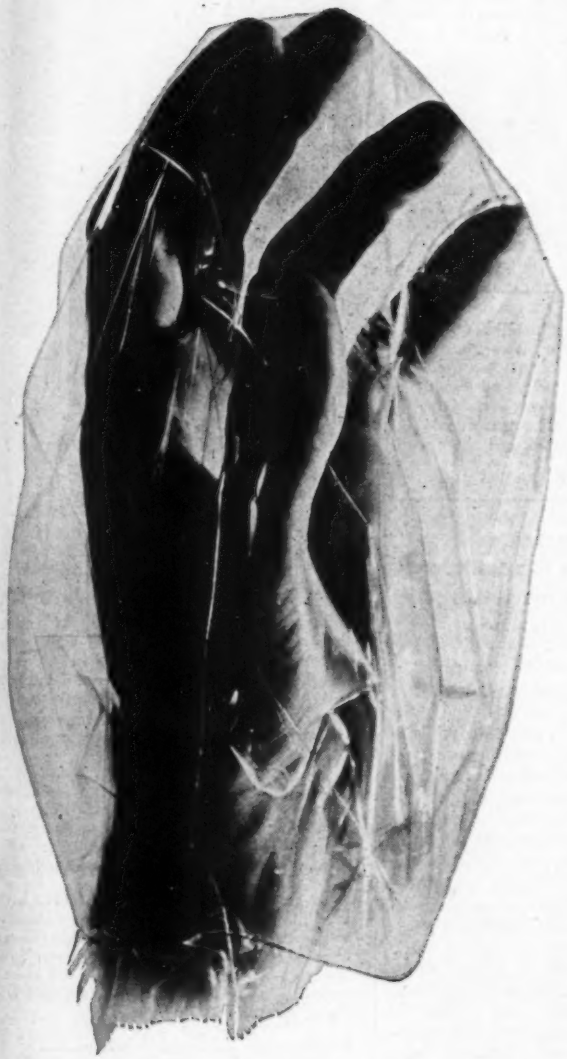

Extraordinary film-forming ability makes Methocel a most useful material. It produces tough, flexible films that are clear, colorless and free from taste or odor. Of outstanding importance—Methocel films are soluble in water—a unique and valuable property that suggests a variety of new uses. For other jobs, resistance to water can be increased.

Methocel films or coatings are unusually stable to discoloration or attack. They are also neutral and non-toxic and are easily plasticized where extra softness is required.

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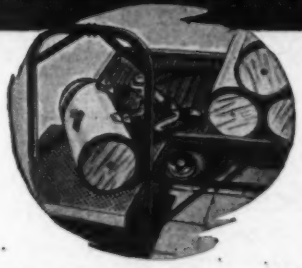
THE UNIFORM SIZING MATERIAL



In paper sizing and coatings, Methocel's film-forming properties are unusually effective. These properties are responsible for Methocel's ability to form a continuous barrier on the surface of the stock for retarding penetration of oils, greases, ink vehicles, paraffin and paper lacquers. The use of Methocel, therefore, promotes production, saves raw materials and lowers costs.

Application at the size press, water box, or by means of supplementary coating equipment, assures optimum results from even small quantities. Technical data available on request.

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includes the power plant which we consider a producing department and which, in fact, produces probably the most vital product of the plant. Since the formation of the Labor-Management Committee in April, 1942, nine of these twenty-two producing departments have established twenty-six all-time high, monthly production records. We have one department which since April, 1942, has set six all-time high, monthly production records. This is all the more remarkable when you consider that in none of the cases has additional equipment contributed to the establishment of the record — in one case the record was established with less than normal equipment.

The establishment of a record production by a department is recognized by the presentation, with official ceremony, of a plaque recognizing the production record. Thereafter, should that department again break its record, a gold star is presented for application to the production plaque. We make quite a ceremony out of the presentation of the original plaque.

You are naturally interested in how this amazing performance has been accomplished. I can tell you that it is through, first, the sincere desire of all employees to assist in the war effort, but also, and probably chiefly, through the fact that we had 119 employees constantly contributing to increased production through the protection of the safety and health of the employees, the physical properties on the plant, the defeat of absenteeism, the maintenance of equipment in operating condition and the elimination of waste.

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We also manufacture cutting cylinders, anvil rolls, squeeze rolls. We make a specially constructed steam jacketed 2" and 3" pump for handling viscous materials, such as filled asphalt, heavy lubricating oils, vegetable oils, paints, etc.

It is considered by the employees an honor to be appointed a member on a subcommittee. Buttons denoting membership of the Labor-Management Committee and subcommittees are worn proudly. It has been necessary only once to replace a subcommittee chairman and in this particular case, it was on the chairman's own application because he thought he was not doing justice to the job. As long as the work of this committee is continued on a voluntary basis with a very definite object constantly in view, and meetings are held with sufficient frequency to maintain interest, the success of our committee, I am sure, is guaranteed.

I look for the Labor-Management Committee to have a very definite and necessary place in postwar industrial organization. It does not interfere with the business of the employees' unions nor does it encroach on the policies of management. It is very definitely supplementary — always ready to handle any problem that no one else wants to tackle.

This is the fifth installment of abridgments of papers presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, held in New York City, February 14-17, 1944. Succeeding issues of this magazine will contain further installments.

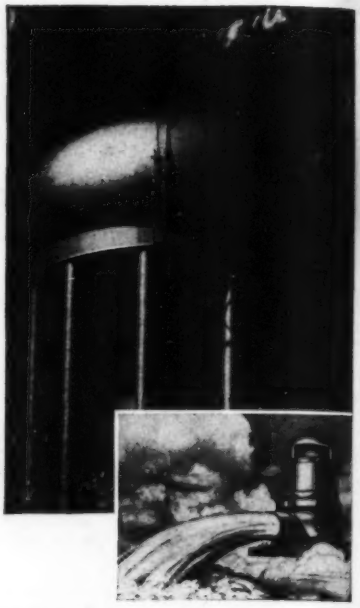
New Procedure for Evaluating the Opacifying Properties of Pigments

ALAN P. ADRIAN, Chemist
Detroit Sulphite Pulp & Paper Co.

A need has been felt for a method of evaluating the opacifying power of pigments in the form of condensed pigment films, both with and without the presence of other materials with which such pigments may be mixed, as is the case in paper manufacture. The compacting of finely divided pigment particles into the form of films may be expected to give rise to optical effects not quantitatively predictable, because of the decrease in the specific pigment—air interface, alterations in secondary scattering, and, in the case of admixed materials, an effective change in optical interfaces. More specifically of interest to the papermaker are the questions of opacity in pigmented papers, wherein are present agglomerated pigments, together with starch, alumina, and possibly other materials interspersed through the pigment agglomeration.

There are two contrast ratios of interest to the paper industry: (*a*) TAPPI opacity, and (*b*) printing opacity. For a number of reasons, the measurement of printing opacity is very much to be preferred. (The Institute of Paper Chemistry, *Paper Trade J.* 109, no. 4:29-34, July 27, 1939.) Judd (*Bur. Standards J. Research* 12:345-351, 138) has pointed out certain sources of error involved in measuring paper opacity by the contrast ratio method.

Although there has been considerable effort made to observe the effects of varied conditions of loading on the retention of filler in the paper (Shaw, Merle B., and



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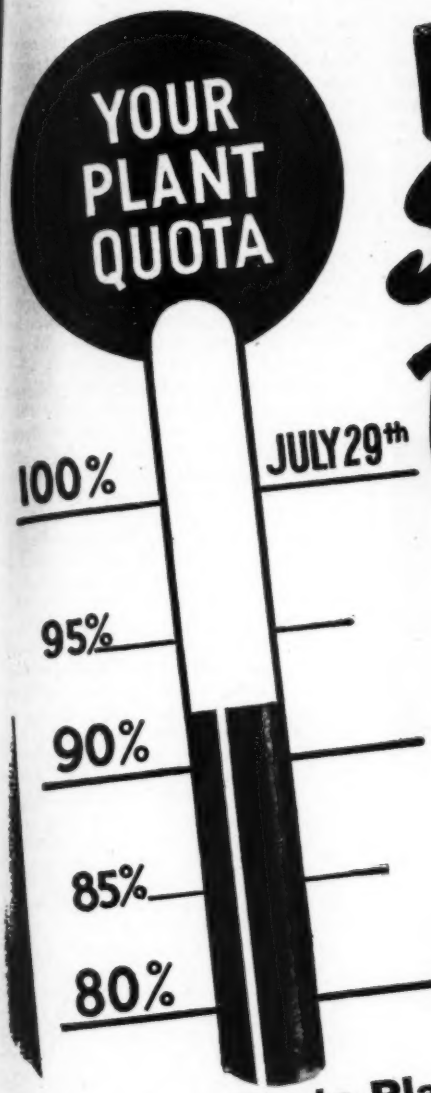

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July 29th is the last pay day in the Drive.

The U. S. Treasury has set the overall goal at $16,000,000,000 —$6,000,000,000 from individuals alone. This is the biggest sum ever asked of the American people—*and it must be raised!*

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2. Regular Payroll Savings deductions made during the drive accounting period will be credited toward the plant quota.
3. Employees are expected to contribute toward raising the cash quota by buying extra 5th War Loan Bonds: 1—Outright by cash. 2—By extra installment deductions. 3—By extra installment deductions plus cash.

Example: JOHN DOE MFG. CO.—1,000 Employees

1,000 Employees x $100 . . $100,000 Cash Quota

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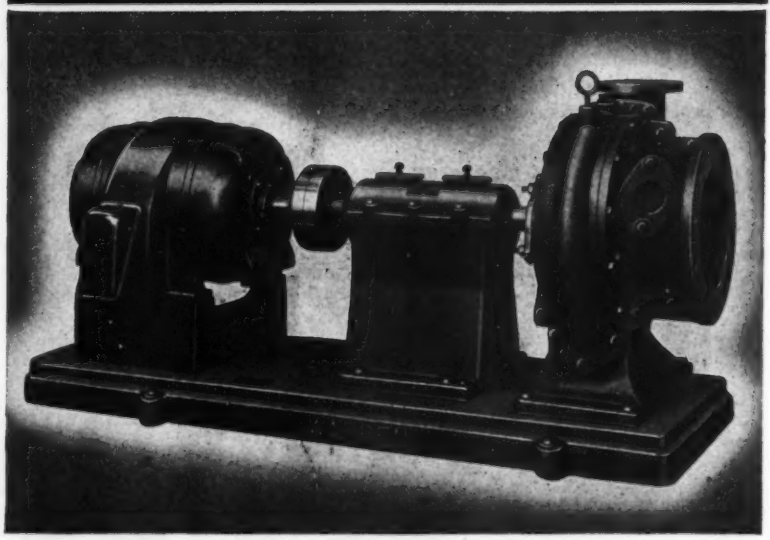
★ *This is an official U. S. Treasury advertisement—prepared under the auspices of Treasury Department and War Advertising Council.* ★

Bicking, George W., Comparison of American and Foreign Clays as Paper Filler. U. S. Bureau of Standards, Technologic Paper No. 262, Washington, Govt Print. Off., 1924, p. 337-380), little work has been done on the effects of such conditions on opacity. Willets (*Paper Trade J.* 97 no. 12:35-38, Sept. 21, 1933; *Tech. Assoc. Papers* 17:423-426, 1934) compared the increase in opacity of a sheet when the filler was added in the normal fashion and when it was mixed with the size and placed on the surface of the sheet. Probst (Unpublished work. The Institute of Paper Chemistry, 1937) carried on a practical investigation of the effect of hard water and alkali on the opacifying powers of titania. He found that certain differences in opacity resulted from various amounts of alum added to the furnish.

Light incident upon an opaque material is in part reflected, transmitted, and absorbed. Relations between the incident, reflected, and emergent light have been worked out in various forms (Ryde, J. W., *Proc. Roy. Soc.*, London, A 131:451-464, 1931); (Kubelka, Paul, and Munk, Franz., *Z. tech. Physik* 12:593-601, 1931). Kubelka and Munk carried through the derivation in such a manner that their equations are readily applicable to quantities ordinarily measured. A reproduction of these formulae and a discussion in English is given by Steele (*Paper Trade J.* 100, no. 12:37-42, March 21, 1935; *Tech. Assoc. Papers* 18:299-304, 1935).

NOT *SIX* MINUTES
. . . BUT *THREE*



is the time taken by a Warren Type SOD Pump in which to fill the Beater in one of the efficient rag mills that have made Western Massachusetts so well and favorably known in the fine paper field. This particular pump was bought to do the job in *six* minutes but the reserve capacity cut the time exactly in half.

Sooner or later you will be confronted with conditions or circumstances where added capacity without additional cost in equipment or maintenance would be a real asset. Prepare for such an eventuality by always specifying and insisting upon

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The fundamental optical properties of paper follow the Kubelka and Munk equation. In all cases it is required that absolute reflectances be obtained for the material in question. This is not difficult to measure, provided the material is in such a form that such measurements are valid. In this work, the General Electric recording spectrophotometer was used for these measurements.

The pigment must be in such a form that there is an appreciable difference in its reflectance, when it is backed by black and when it is backed by white. Obtaining the material—e.g., pigment—in this form has been one of the main problems of this work.

The scattering coefficient for a pigment may be obtained by various means. However, in order to insure a value unaffected by the presence of other materials, one should have a method for obtaining the coefficient independent of any second medium. The first step would be to prepare the pigment in the form of a film. That is, it should be spread or smeared out in sheet or film form with no adhesive or cohesive material present.

The procedure for film formation is as follows. The pigment was mixed into slurry form using a Mixmaster. Three hundred cc. of distilled water was introduced into the bowl of the mixer and sufficient air-dry pigment was added to form a fairly concentrated slurry. In the case of a water-dispersed titanium pigment, this amount was 254 grams. For a nonwater-dispersed titanium pigment, this was 116 grams. Mixing at moderate speed was continued for one hour. The slurries, removed from the bowl, were diluted with distilled water to such a volume that the oven-dry concentrations, determined by delivery from a wide mouth pipet, was about 0.15 g./cc.

Sufficient volume of this concentrated suspension was taken so that, when it was diluted to 1000 cc. with distilled water, the diluted suspension would contain 0.31 g./150 cc. The diluted suspension was stirred 10 minutes in a malted-milk mixer operated at high speed. One hundred fifty cc. of this suspension (0.31 gram of pigment) were diluted to 300 cc. with distilled water and stirred in a malted-milk mixer for 5 minutes. This suspension, containing approximately 0.31 gram of pigment, furnished one charge for the centrifuge whose bowl capacity was 300 cc.

The backing material was introduced into a Sharpless Super centrifuge cylinder bowl so that it lay around the inner wall and the cylinder was brought to a speed of 16,000-17,000 rpm. The 300-cc. suspension was introduced into the rotating cylinder through its bowl base from a height of seven feet by means of a glass funnel and rubber tube. A wide, 1/16 inch injection tube was used. When the 300 cc. had been introduced, the centrifuge speed was slowly brought up to 20,000 rpm and kept at that speed for 7-8 minutes. The bowl bottom fitted the cylinder rather loosely, so that the clear liquid dripped out of the bottom of the cylinder during these 8 minutes and at the end of that period all the liquid was out of the cylinder. Tests were run to discover what difference, if any, existed whether the liquid remained or

ran out. In the case of the water-dispersed titanium a surface effect seemed to be involved which was eliminated when proper pH adjustment was made.

At the end of the 7-8 minute period, the centrifuge was stopped and the film on its backing material was removed. A short drying period of about 2 minutes was allowed and the film was reinserted into the cylinder in an inverted position (top to bottom, not obverse to reverse). A second charge of 300 cc. containing 0.31 gram pigment was introduced and the above procedure for throwing the pigment out of suspension was followed. The film, after removal from the centrifuge, possessed the desired properties of uniformity, thickness, etc. Before making any reflectance measurements on this film, it was air-dried. Drying required only an hour, but in all cases considerably longer time was allotted. Central horizontal strips, about 2 x 1.50 in., were used for measurements.

The background material for the pigment film was ethylcellulose in sheet form (Ethocel sheeting). The material was suitable from a mechanical standpoint. To show that it was suitable from an optical standpoint, it was desirable to indicate that little or no optical contact existed between the pigment particles and the Ethocel. To do this, an auxiliary piece of Ethocel was placed over the front surface of the dry film. Presumably no optical contact existed between this auxiliary piece and the film. Reflectance readings were taken on both surfaces, using the G.E.R.S.

Three commercial papers of different opacity were used. No. 1 was a wrapping paper, No. 2 a condenser paper, and No. 3 an envelope paper. The following reflectance curves were obtained for each paper.

1. Paper backed by magnesium carbonate.
2. Paper backed by Ethocel and magnesium carbonate.
3. An opaque pad of the paper.
4. Paper backed by Ethocel and a black body.
5. Paper backed by the black body alone.

To determine the best method for finding basis weight measurements on the film material, some observations were made on Ethocel itself, and then with clay and titanium dioxide.

It had been thought that the basis weight of the filler might be obtained by difference from the weight of Ethocel plus filler and Ethocel alone. The data show this inadvisable, because the Ethocel weight change is too great. This is especially true if one considers that the weight of filler is only 3-4% of the Ethocel weight.

It was decided best to directly weigh the filler from a certain area. Because of the small change in weight in going from 0 to 100% humidity, it was unnecessary to condition the pigment before weighing.

To facilitate the correct basis weight measurement, a template was made with one open end. An internal area of exactly one square inch was marked on this brass template. A small scraper was fashioned for removing the pigment from its Ethocel background. The area of film on which reflectance measurements had been made was so cut that the template could be placed over that area and the pigment removed through the open end. With the aid

American Pioneers

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of a feather brush, the material was removed to a tared microcrucible. An accuracy of 0.01 milligram was sufficient.

The relative opacifying power of titanium pigments and a clay pigment and also the influence of alum upon the opacifying power of the titanium pigments were found to be in agreement, whether determined by a pigment film method or a handsheet method.

This method was shown to be applicable to the study of various changes in the specific scattering coefficient of a pigment. These changes may occur due to the influence of: (*a*) packing of pigment particles, (*b*) variation in pigment particle size, (*c*) and addition of such materials as alum in varied amounts.

It is believed that the film method may be used to study certain other conditions which may influence the opacifying power of a pigment. For example, a film of pigment mixed with various amounts of starch may be formed easily. Also pigments other than the ones investigated in this work might be studied.

The General Aspects of GR-S Rubber Saturants

RALPH T. NAZZARO, Industrial Fellow
Mellon Institute of Industrial Research

It has been found practical to use Buna S latex (now GR-S latex) for the saturation of papers. This result should not be construed as a full endorsement of the elastomer for the general job of saturation from aqueous emulsions and dispersions. The synthetic latex in its present stage of development merely fulfills an immediate emergency demand.

In consequence of the war, manufacturers of rubber-treated paper have found it necessary to investigate other types of elastomers. Because of availability and ease of adaptation, vinyl acetate polymers in aqueous dispersion have been accorded much favorable attention and employment. With experience in the handling of resinous saturants, certain shortcomings related to the rotation of flexibility have been corrected through research.

The recent introduction of GR-S latex to the field of saturation has stimulated further investigation into the relative value of synthetic rubbers in general for the treatment of papers. The GR-S saturated papers offer certain advantages over resinous treated sheets, particularly in low-temperature flexibility and persistence of flexibility, but have neither the same ease of application nor the relatively high tear characteristics of low solids resin impregnants.

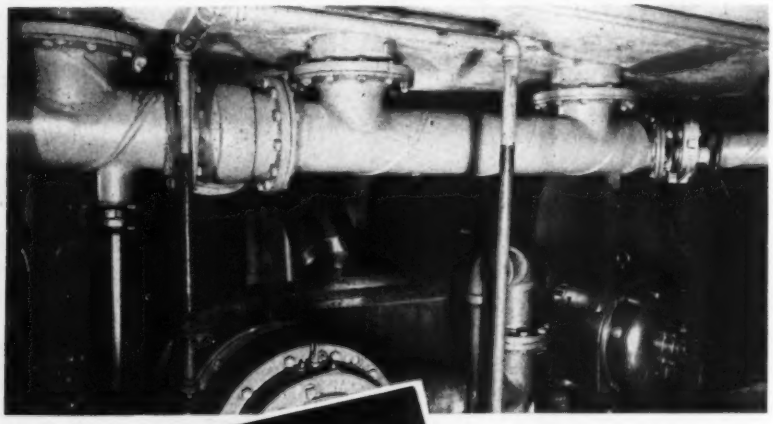
No synthetic elastomer or plastic has been found which possesses the peculiar combination of physical and chemical properties of natural rubber.

Fresh rubber latex consists of minute particles of solid or semi-fluid material (probably the rubber hydrocarbon) in suspension in an aqueous serum. It is reported to have a *p*H of about 7.0; the *p*H of most commercial normal latices is made alkaline by ammonia to about 10 to 12. Ammonia is utilized as the chief preservative for fresh latex in order to prevent auto-coagulation from the activity of anaerobic bacteria or from the action of enzymes on the latex protein. In addition to organic acids such as acetic, lactic, levulinic and succinic, which are reported to develop progressively during the destabilization of the unpreserved latex, there are found a number of nonrubber constituents classified broadly as resins, proteins, sugars and inorganic salts. Rubber latex, therefore, can be visualized as a complex emulsion of variable composition with rubber as the principal dispersion phase. Rendered ammoniacal, it has good storage stability and is readily applicable to various industrial processes, including saturation.

Vulcanization of the rubber will reduce plasticity and improve tensile strength, resilience, elasticity, permanent set, and water resistance. Similar improvements can be made in rubber latex saturated papers by skillfully compounding the latex with small amounts of powerful, active rubber accelerators, preferably in solution, as well as sulphur, zinc oxide, and a suitable nonstaining rubber antioxidant.

Buna S rubber is a butadiene-styrene copolymer. It has recently become available in latex form and, where compounded further, can be used as a saturant for loosely felted papers. As it is being manufactured, the colloid is very sensitive to the addition of electrolytes.

The synthetic can be stabilized by the addition of 1 to 5% of various surface-active agents, for example, Aerosol OS, Duponol ME, Gardinol WA, Nacconal



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NR, and Santomerse No. 3. Techniques evolved for the evaluation of natural latex stability; i.e., mechanical or working stability, do not forecast true values for GR-S latex. Technological methods associated with the handling of natural latex serve as excellent guides in the adaptation of the new synthetic to old processes.

GR-S latex is generally marketed at 40 to 55% solids under various code connotations, probably referring to each manufacturer's control. The actual rubber content is somewhat lower than this figure and, although no information has been made public on the nature of any non-rubber ingredients, it is understood that they consist mainly of variable soap concentrations, stabilizing agents, some free alkali, and a rubber antioxidant.

The *p*H of the latex is between 10.0 to 11.0, and, if the usual precautions against strong electrolytes are taken, the latex can be diluted with water down to 10% solids without difficulty. It is recommended, however, that the latex be fortified beforehand with one of the dispersing agents mentioned above and that the initial dilution be accompanied with slow stirring (10 to 20 rpm). Water is always added very slowly to a fortified latex. After the latex has been cautiously diluted, the solids can be reduced further, if necessary, by adding water containing 0.25 to 0.50% by weight of Duponol ME or any other suitable stabilizer. Protein, such as casein, dissolved by alkalis (preferably ammonia), improves the fractional stability, but an excess of the alkali will also cause thickening of the colloid and flocculation of the dispersed phase. Amounts of casein up to 5% based upon the dry solids of the latex are beneficial.

The colloid and the synthetic rubber dispersed therein are compatible with natural Hevea latex, whereas mixing with reclaimed dispersions of old rubber usually presents various manufacturing problems in stability owing to the high alkali content of most rubber dispersions. By compounding the synthetic latex with an alkyl-aryl sulphonate type stabilizer and about 1 to 2% protein, the admixing in any proportion follows satisfactorily.

The rubber from GR-S latex can be vulcanized, using the general technology adapted from natural rubber. The rate of cure is considerably slower, but proceeds with less change from overcure or over-compounding.

The resin most commonly associated with the saturation of paper is vinyl acetate, of which emulsions are available, both plasticized and unplasticized. The particle size of these emulsions has been on the whole larger than the average of other synthetic rubberlike latices, but fortunately this condition has not inhibited their use as substitutes and replacements for rubber in essential civilian products manufactured from impregnated papers. The technique of applying vinyl acetate resins to saturating paper has been reported previously.

The tear resistance of GR-S treated papers is somewhat lower than a natural latex saturated sheet of the same quality paper and same solids deposition. At low solids concentration, the GR-S also behaves more poorly than a sheet containing plas-

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ticized vinyl acetate-resin. The resistance of tear follows an upward trend as the saturating rubber solids are increased, and, in the case of GR-S, a sheet treated with a 15% saturant approaches the natural rubber tear while surpassing the resin saturant. The latter rises rapidly up to 10% solids, but flattens out noticeably at this concentration and upward to 15% solids.

Although natural rubber latex is still its best replacement in the manufacture of tough, flexible papers, there is good evidence to believe that the almost minor deficiencies of the synthetic for this work will be overcome either through the development of new copolymers or by the addition of compatible film-forming reinforcing plastics.

With so many prospects on hand, it is unnecessary to speculate on the future of GR-S or any other rubber-like polymer as a saturant. The most that can be said is that GR-S latex is filling in the gap between natural latex and the elastoplastics. By suitably compounding GR-S rubber we have substantially improved the retention of flexibility and have thereby removed the variables connected with the use of plasticizers. Laboratory tests have demonstrated satisfactory low-temperature flexibility for GR-S saturated paper down to —25 C. to —30, whereas plasticized resin saturants yield most any variation of temperature from +20 C. down to —15 C., depending upon the choice in plasticizer. Sacrifices in tear strength very frequently accompany the accomplishment of low-temperature flexibility in resin sheets.

Esters of Certain Lignin Derivatives*

JOSEPH C. CLARK[1] and F. E. BRAUNS[2]

Among the numerous attempts to utilize lignin are those which have been made by the plastic industry. Lignin itself, either in the form of acid lignin (obtained by means of strong mineral acid in the wood-saccharification process) or in the form of alkali lignin (obtained on acidification of black liquor from the soda pulping process), is a poor material for plastics, even in combination with other plastic bases.

One difficulty in the use of lignin in plastic materials is the presence of various types of hydroxyl groups, which made the lignin a relatively hydrophilic compound. Even if, in the molding process, a certain number of hydroxyl groups is eliminated by condensation, there still are sufficient free groups available so that the final plastic has a high water absorption. It is obvious that a decrease in the number of free hydroxyl groups should make the lignin less hydrophilic and, consequently, the plastic made from such a lignin should be more water resistant.

Esterification is the simplest and, therefore, the most common method for covering hydroxyl groups. In a recent paper, Brookbank, et al. (*Paper Trade J.* 116, No. 13:27, April 1, 1943; *Tech. Assoc. Papers* 26:97-8, 1943; *Ind. Eng. Chem.* 35:1113, 1943) described the preparation of 18 esters of monobasic aliphatic acids and of a few dibasic aliphatic acids of a commercial alkali lignin (Meadol). Of these esters, the stearoyl ester was found to be a good mold lubricant for various plastics. The marked solubility of this lignin stearate in organic solvents may make it suitable for use in ink and paint formulae. As was to be expected, molded wood plastic articles containing a small percentage of lignin stearate showed an improved water resistance.

The properties of some esters prepared from coniferous lignin isolated by the Klason method with 70% sulphuric acid recently were described by McNair and John (*Paper Trade J.* 117, No. 8:85, August 19, 1943). The organic esters, like the original lignin, were insoluble in the common solvents but condensed with phenol, aniline, and acetaldehyde. No loss of methoxyl was observed.

Because there probably are other possibilities for the use of lignin esters in industry, a number of esters of alkali lignin A, of phenol lignin A, and of phenol Willstätter lignin have been prepared to study their chemical and physical properties.

The following esters were prepared:

Alkali spruce lignin A

Acetyl

Undecanoyl

(1) Student, The Institute of Paper Chemistry; Present address: West Virginia Pulp and Paper Company, Charleston, S. C.; (2) Research associate, The Institute of Paper Chemistry.

(*) A portion of a thesis submitted by J. C. Clark in partial fulfillment of the requirements of The Institute of Paper Chemistry for the degree of Master of Science from Lawrence College, Appleton, Wis., May, 1943.

Benzoyl
p-Toluenesulphonyl
Phenylurethan
Phenol spruce lignin A
Acetyl
Propionyl
Butyryl
Valeryl
Benzoyl
3,5-Dinitrobenzoyl
p-Toluenesulphonyl
Phenylurethan
Phenol Willstätter lignin
Acetyl
Benzoyl
p-Toluenesulphonyl

The data of alkali spruce lignin A show that, in general, only 4 hydroxyl groups are esterified. The low molecular weight of the acetyl group has little effect upon the methoxyl content; and, therefore, the difference of the methoxyl contents of a tetra- and penta-acetyl ester is too small to distinguish between them. The acyl group with a higher molecular weight, however, affects the methoxyl content to a much greater extent. Of the 4 high molecular acyl esters, 3 form tetra-acyl esters; the benzoyl ester is a penta-benzoyl alkali lignin. No definite explanation can be given for this discrepancy.

The differences in the calculated methoxyl contents of the hepta- and octa-acyl esters of phenol spruce lignin A are all within the limits of experimental error (with the exception of the dinitrobenzoyl ester). These small differences are caused by the high molecular weight of the lignin, in conjunction with the entrance of a compound (phenol), which increases the hydroxyl content of the final lignin derivative but decreases the methoxyl content to about 66% of its original value.

Although it is impossible to draw definite conclusions as to the number of acyl groups present in the low molecular weight aliphatic esters, the sulphur content of the *p*-toluenesulphonyl phenol spruce lignin A undoubtedly suggests the formation of an octa-acyl ester. The same is true for dinitrobenzoyl ester, because the calculated methoxyl content (4.5%) of the octa-acyl ester is in much better agreement with the found methoxyl value (4.6%), than is the methoxyl content (5.3%) calculated for the hepta-acyl ester. The valeryl ester, for which over 9 acyl groups are calculated on the basis of its methoxyl content, was undoubtedly impure. Its relatively low melting point (85–90 degrees) and its high solubility (even in petroleum ether) made the purification very difficult and the odor of the final product indicated that free valeric acid was retained by the product.

The few data on the esters of phenol Willstätter spruce lignin do not allow any definite conclusion to be drawn as the number of hydroxyl groups esterified. Although the theoretical methoxyl values calculated for the entrance of 5 and 6 acetyl and benzoyl groups, respectively, lie too close together, the number of acyl groups calculated on the basis of the methoxyl content is close to 5 and 6 respectively; whereas, for the toluenesulphonyl ester when calculated on the basis of the sulphur content, it is again closer to 5. More

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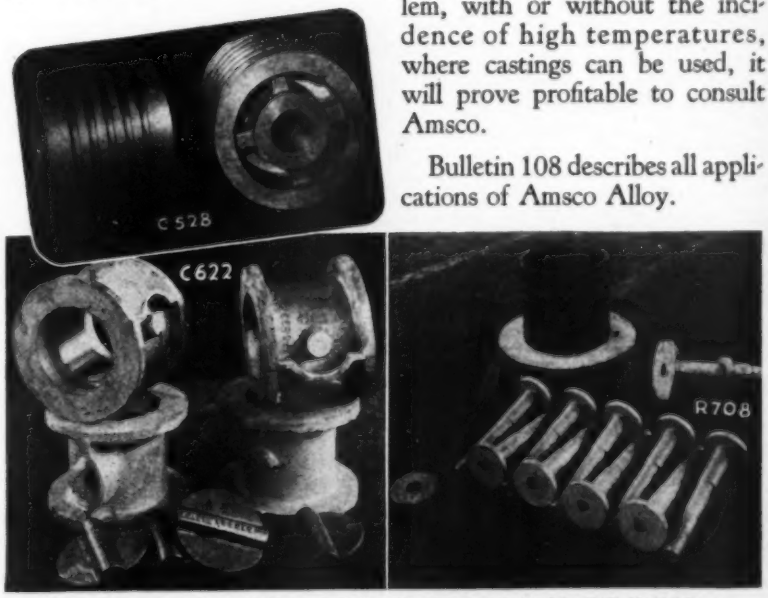
Picture C-528 shows pistons of Amsco Alloy F-8, for resisting corrosion in the hot oil pumps of an Illinois refinery. This alloy, which contains 20-22% chromium and 8-10% nickel, is primarily employed to withstand erosion, pitting, etc., from the corrosive action of acids, acid solutions and gases; and is also serviceable under temperatures up to 1600° F.

Picture C-622 shows some valves and valve bodies employed by an aluminum producer in handling corrosive liquids. These castings are of Amsco Alloy F-10, containing 26-28% chromium and 10-12% nickel, which is also an excellent corrosion resistant metal in many uses and is, additionally, more efficient under high temperatures than F-8.

Picture R-708 shows several of a number of Amsco Alloy parts for the wood pulp digester at a sulphite paper mill. An excess of free sulphur dioxide in the solution makes it essential that the metallic fittings of the digester be made of a corrosion resistant material, like the Amsco Alloy F-10N formula, which contains approximately 29% chromium and 9% nickel.

If you have a corrosion problem, with or without the incidence of high temperatures, where castings can be used, it will prove profitable to consult Amsco.

Bulletin 108 describes all applications of Amsco Alloy.



Advantages of Amsco-Nagle Centrifugal Pumps described in Bulletin 940.

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work, which is already in progress, has to be carried out. In no case, however, is an acyl ester of phenol Willstätter lignin obtained with more than 6 acyl groups. This is of interest when the number of hydroxyl groups capable of acylation is compared with that of phenol spruce lignin A.

Phenol Willstätter spruce lignin differs in its preparation from phenol spruce lignin A in that the former is obtained by the action of phenol upon lignin previously isolated by the action of supersaturated hydrochloric acid upon spruce wood, whereas the latter is obtained by the action of phenol under the same conditions directly upon spruce wood. This would indicate that, during the isolation of the lignin by the Willstätter method, some hydroxyl groups are lost (probably through condensation and polymerization) and are not restored by the formation of the phenol condensation product.

On the other hand, it is true that the methoxyl content (11.9%) of phenol Willstätter spruce lignin is about 1.4% higher than that of phenol spruce lignin (10.5%). This may result from a lower phenol content (3 molecules instead of 4) or from a higher methoxyl content of the Willstätter lignin, which is usually 15.5 to 16.0%, as compared with 14.8% for native lignin. The correct answer may be that, in the formation of Willstätter lignin, one hydroxyl group is lost by condensation of the lignin with itself and that this condensation causes the Willstätter lignin to react with 3 phenol molecules only (instead of 4), causing a further decrease of one hydroxyl group. Further experiments are in progress.

Acetone and dioxane are good solvents for the lignin esters, whereas most of the esters are insoluble in absolute methanol, ethanol, ether, and petroleum ether. However, with increasing chain length of the acyl groups, the solubility in the latter solvents increases.

Products such as lignin esters, which are amorphous, do not have sharp melting points; hence, a melting point is of no value for determining the purity of the product as in the case of crystalline compounds.

The Wood Pulp Situation

DAVID GRAHAM, Chief of Pulp Allocation Forest Products Bureau, WPB.

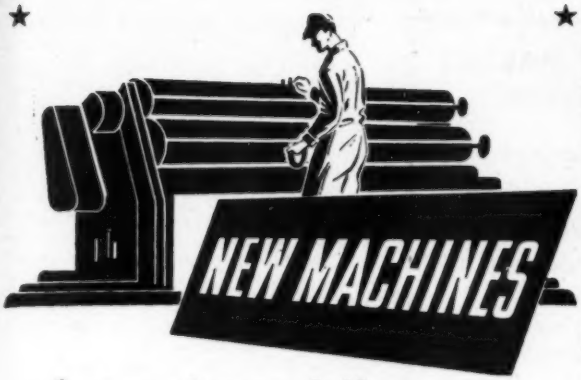
On December 8, 1941, when the United States of America formally declared war upon the Axis the hope of further imports of Scandinavian pulp for the duration of the European war disappeared. At the same time, the Ordnance Department began to make increasing demands upon the market supply of pulp to support a huge program of munitions manufacture. It also became necessary to export increasing quantities of pulp to our Allies in Britain and in Latin America.

Offsetting these factors to some extent, the production of wood pulp by domestic producers increased. In 1940, domestic production was 8,826,000 tons. By 1941, in response to increasing demands for paper and diminishing imports, domestic production rose to 10,081,000 tons and in 1942 continued to increase, reaching 10,461,000 tons. In 1943, however, the scarcity of woods labor and the deterioration of equipment forced production back to a level of 9,381,000 tons. The imports of Canadian wood pulp also increased as the Scandinavian imports declined. In 1940, imports from Canada and Newfoundland totaled 778,000 tons which rose to 1,075,000 in 1941. In 1942, receipts of Canadian and Newfoundland pulp reported at United States mills were 1,197,000 tons; in 1943 receipts reported at United States mills were 1,255,000 tons.

In spite of increased production and Canadian imports, however, the supply of market pulp in early 1942 was critically short. Aggravating this condition was the fact that available pulp was unevenly distributed. Many mills had built up several months' supply of inventories while others were unable to obtain enough pulp to meet essential requirements. The pulp producers were well aware of this situation yet lacked information to remedy it.

Out of the shortage of pulp grew two major developments in the early part of 1942. First, the wastepaper collection campaign was pushed on a country wide basis. Consumption of fibers other than wood pulp in the manufacture of paper and paperboard increased. In 1941, reported consumption of wastepaper, rags, straw, and other fibrous materials were 5,712,000 tons, in 1941 it was 7,219,000 tons, in 1942, it was reported as 6,832,000 tons, and in 1943 it rose above its 1942 rate to 7,498,000 tons. One of the major factors accounting for the huge increase in consumption of fibrous materials other than wood pulp was the increase in paperboard production.

The other major development arising



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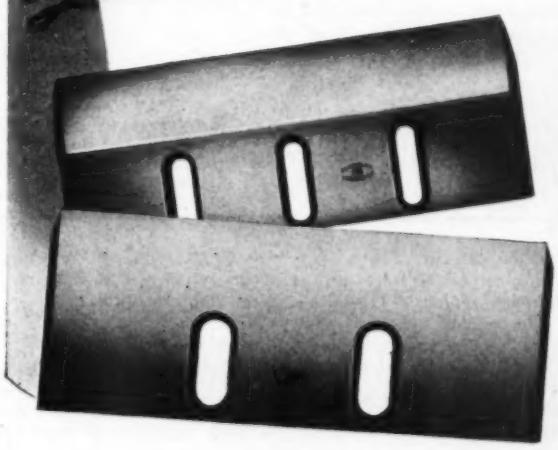

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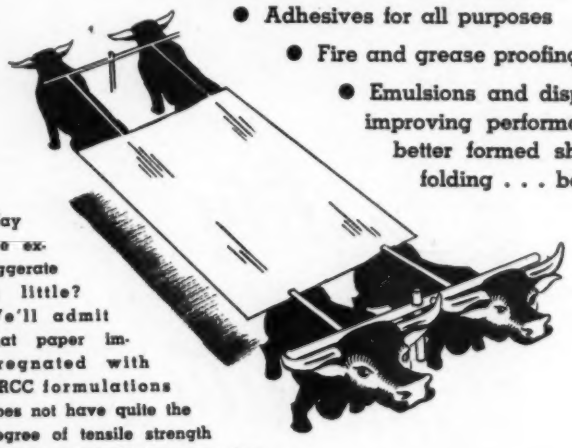

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from the shortage of wood pulp was the passing on March 12, 1942, of General Preference Order M-93 which put wood pulp under total allocation. This order replaced M-52, a temporary measure devised to spread the burden of nitrating pulp shipments. The provisions of M-93 required pulp producers to file monthly shipping schedules with the War Production Board and consumers to file monthly orders, receipts, consumption, and inventories. Allocations of wood pulp were then made to mills with insufficient inventories to operate during the delivery month and have a safe inventory at the end of the month. These allocations were made by the War Production Board aided by the advice of the Wood Pulp Allocation Industry Advisory Committee.

In the summer of 1942, during the transition from a peacetime to wartime economy, there was a sharp slump in the paper market which was reflected in the domestic production of wood pulp. In April of 1942, domestic production was 948,000 tons; in May it was 946,000 tons, and by July it dropped to 797,000 tons. At the same time, mills began to build inventories again. Total month end inventory held by domestic consumers and producers rose from 776,000 in April to 978,000 at the end of August.

The fact that this decline in production came at this particular time was extremely unfortunate because the curtailment of operations meant that both woods and mill labor were lost and it later proved impossible to replace this labor supply. Although consumption began to increase by the fall of 1942, pulp production did not recover by a like amount. As paper and paperboard increased, inventories of both pulp and wood rapidly declined as it became difficult to obtain woods labor and as logging equipment and trucks wore out. Inventories of wood pulp dropped from 978,000 tons at the end of August, 1942, to 872,000 at the end of the year 1942, and to 668,000 at the end of June, 1943. Wood inventories declined to 2,324,000 from 3,828,000 cords during the same period. Inventories of wastepaper declined from 584,000 tons in August, 1942, to 409,000 tons in June, 1943.

In June, 1943, it became evident that, in order to keep in operation certain mills producing materials essential to the war effort, it would be necessary to withhold some pulp from integrated operations for shipment to the open market. This step was taken under Order M-93.

As the supply situation continued to become more difficult during the summer of 1943, it became evident that a closer control of wood pulp use would become necessary. Therefore, a new form WPB-2973 was issued on which every producer of paper was required to report monthly furnish data covering proposed paper and paperboard production for the succeeding month. These forms were carefully analyzed in making monthly allocation to individual mills.

These first WPB-2973 forms were based on paper grade classifications taken from the Census Classification on WPB-514, however, and were in many cases inadequate. Therefore, in November, 1943, a new WPB-2973 was drawn up. The paper classifications used were improved and end user information was added. These new forms were put on a quarterly basis. Up to the present time, this information on end use has been used mainly for the purpose of aiding the Requirements Committee of the War Production Board in analyzing the relative distribution of the paper and paperboard produced in the different segments of the industry. However, due to the curtailment of production and the increasing demands for paper and paperboard for direct and indirect war purposes, we must not lose sight of the fact that the data on end use may become an increasingly important factor in the determination of allocations to individual mills.

In the fall of 1943, also, the Pulp and Paper Division was reorganized into two new Divisions and two new offices; namely, the Paper Division, the Pulp Allocation Office, and the Office of Pulp Production. This latter office was delegated to handle the production of pulpwood. The old Fibrous Materials Section of the Pulp and Paper Division became the Office of Pulp Allocation. All of the new offices and the divisions, as well as the Lumber and Container Divisions were put directly under Harold Boeschenstein, chief of the Forest Products Bureau.

On December, 1943, estimates as to domestic production, imports, and exports of wood pulp for the first quarter of 1944 were received by the War Production

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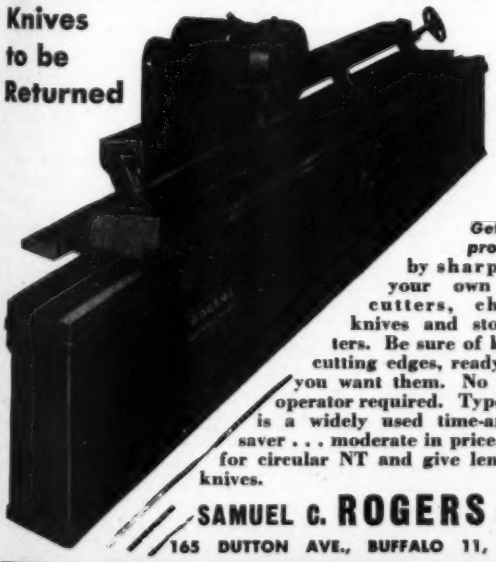

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Board. At the same time, estimates of proposed use of each type of fibrous material in the production of paper and paperboard and nonpaper products for the first quarter of 1944 were received. It was evident when the supply of and demand for fiber were considered that new supply would fall far short of proposed use.

On December 13, the over-all Requirements Committee of the War Production Board met to consider the situation in regard to paper production for the first quarter of 1944. This is the same Requirements Committee that determines the allocation of steel, aluminum, copper, or any other important material, deemed critical by the War Production Board. At this time recommendations as to the quantities of pulp required to produce the required amounts of each major grade of paper and an estimate of pulp available for first quarter use were presented by the Forest Products Bureau to the Requirements Committee together with an analysis of the underlying wood situation. Estimates of fiber requirements were based to some extent on the use of an increased amount of wastepaper in practically every segment of the industry. Some of the elements taken into consideration in preparing this report to the Requirements Committee were:

(a) Summaries of end-user information condensed from WPB-2973

(b) Proposed production of paper and paperboard as reported for the first quarter

(c) Historical trends in paper production

(d) Requirements of Claimant agencies, namely Civilian Supply, War Department, Navy Department, and War Foods Administration

(e) Estimates of various types of pulp available for consumption

The Requirements Committee determined the production program to be authorized based on the recommendations of the Forest Products Bureau and authorized the use of given tonnages of pulp for the production of paper and paperboard in each major segment of the industry. The problem of how to distribute this tonnage equitably among individual mills was then left to the Pulp Allocation Office.

It is impossible on the basis of present information to make accurate predictions for the future supply of fiber for paper and paperboard manufacture. The following may be said, however.

For the first quarter of 1944, the domestic mills have estimated that they will produce 2,568,000 tons of wood pulp. Based on our past experience, however, we know that this figure is too optimistic.

The Canadian government has undertaken to supply the United States with 1,105,000 tons of wood pulp during 1944 or approximately 92,000 tons per month. Unfortunately, for reasons which are well known to you, shipments from Canada have not been made during January and the month of February to date at this rate. The War Production Board is confident, however, that the Canadian government will make good its undertaking to supply the United States with the agreed 1,105,000 tons of wood pulp during 1944.

For the first quarter of 1944, the War Production Board has authorized the use of 2,779,000 tons of wood pulp for the production of paper, paperboard, nonpaper products, and for export.

It is not possible at this time to predict the extent to which this level of wood pulp consumption may be maintained at the expense of further reductions in our inventories of pulpwood and wood pulp, nor is it possible to tell you now how much wood pulp will be authorized for consumption and export during the second quarter of 1944. The program determination for the second quarter will, however, be made after careful analysis of the most recent data covering production, imports, consumption, exports and inventories of wood pulp and pulp wood. Preliminary indications are that estimated domestic production of wood pulp for the second quarter will be about the same as for the first quarter.

Collections of wastepaper are improving in response to the pressure of the present salvage and publicity campaign. How much farther this improvement may go remains to be seen.

The War Production Board hopes that enough wood pulp and supplementary fiber will be available to keep all mills in operation during the second quarter of 1944. This can only be done if the greatest efforts are made on the part of all mills to increase wood pulp production and wastepaper collection and if the greatest possible economies are exercised in the use of all fibers suitable for papermaking.

The WPB has finally recognized the essentiality of the pulp and paper industry. It is committed to a policy of increasing the

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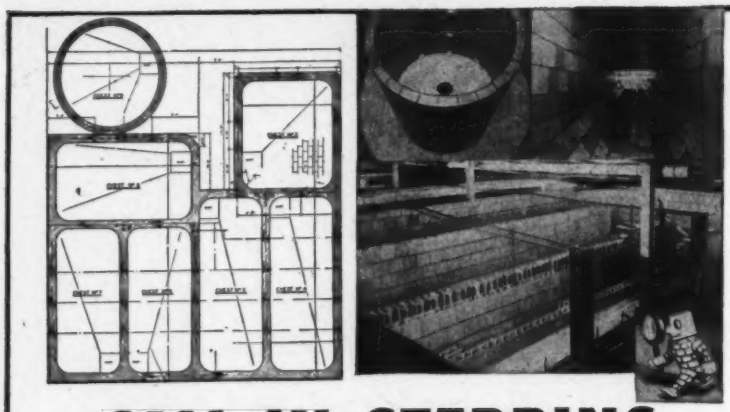

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supply of pulpwood, and wood pulp, and wastepaper, but it will take time to bring about this increase in the supply of these raw materials.

In the meantime, you who are responsible for the technical development of the industry and for the production of paper and paperboard should see to it that plans are made to utilize more wastepaper and supplementary fiber so that in spite of the wood pulp shortage, the paper and paperboard industry will meet the war and essential civilian requirements of the country.

The Relationship Between Cellulose Viscosities Measured by the TAPPI Standard and the Cupriethylenediamine Methods

ALFRED J. COREY, Research Dept.
Fraser Companies, Ltd.

There are several well known methods of measuring cellulose disperse viscosity in cuprammonium solution, such as the TAPPI standard method, (T 206 M-37, Cuprammonium Disperse Viscosity of Pulp) and the American Chemical Society method. Unfortunately, the producers and consumers of cellulosic materials have not yet standardized on the use of one method, and, to add to the confusion, there are numerous modified methods in use in individual laboratories where the accepted methods have been found unsuitable for control purposes.

The cupriethylenediamine method developed by Dr. Hatch (*Pacific Pulp Paper Ind.* 16, No. 10:13, 1942) solves the difficulty in obtaining rapid, reproducible results. Solution of the other mentioned difficulty must await the general acceptance of a standard cellulose viscosity test by all persons concerned with such tests.

In introducing a new testing procedure, it is often necessary to establish a relationship between results obtained by the old method, and similar results obtained by the new method. This relationship links up past control data with the present control tests, and serves as a basis for dealing with customers unfamiliar with the new test. It has been found advisable to establish such a relationship between the TAPPI standard method and the cupriethylenediamine viscosity tests.

For convenience, cupriethylenediamine has been abbreviated to C. E. D., in the laboratory and will be so designated in the following discussion. In order to establish this relationship, a number of fully bleached sulphite pulp samples, covering a suitable range of viscosities, were obtained in the mill or were specially prepared in the laboratory. Four to eight separate viscosity determinations were made with each of the pulp samples, by each of the testing methods.

The cuprammonium cellulose viscosity tests correspond essentially to the TAPPI standard method, except with regard to the calibration of the pipets, and the preparation of the pulp samples. Before undertaking this work the viscosity pipets were all recalibrated with Hartmann Leddon standard viscosity oils which had been checked against a standard reference oil supplied by the National Bureau of Standards. The previous calibration with glycerine solutions indicated a lower viscosity for a given time of flow. Viscosities were measured at 20 C., the pipets being enclosed in a suitable water jacket.

Table I.—A Comparison of the Viscosities of 1% Cellulose Solutions Determined by the Tappi and C.E.D. Methods

Sample No.	TAPPI Method cp.	C.E.D. Method cp.
1	10.5	16.2
2	16.4	31.0
3	18.2	38.0
4	24.5	59.6
5	25.2	64.8
6	30.1	83.6
7	40.2	114.5
8	44.0	129.2
9	48.0	158.5
10	71.2	288.4
11	85.5	440.0

The pulp samples were prepared by drying and then fluffing in a Wennbergs Verkstad dry defibrator. Laboratory tests showed that the action of the fluffer caused no significant decrease in the pulp viscosity.

The C.E.D. tests were carried out according to the method suggested by Dr. Hatch (*Pacific Pulp Paper Ind.* 16, No. 10:13, 1942).

The results of the tests are shown in Table I above.

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NEW EQUIPMENT AND SUPPLIES

Curved-Entrance Sluice Gate

The Water Controlling Apparatus Division, Rodney Hunt Machine Co., Orange, Mass., has announced a sluice gate with entrance curved to cut down efficiency losses as water flows through the gate opening. The degree of curve was worked out after extensive tests. According to the announcement, the tests proved that this

simple modification of conventional gate design would pay high dividends in water control efficiency.

Illustration shows a 48 in. by 72 in. sluice gate of the curved-entrance design.

Angle Tool Attachments

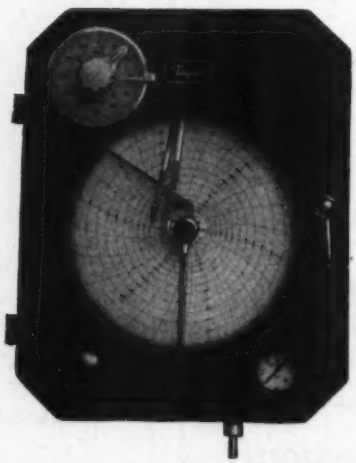
Invincible Tool Company, 611 Empire Bldg., Pittsburgh 22, Pa., has announced a line of angle tool attachments for use with portable drills or driving equipment to

reach hard-to-get-at spots. These attachments are equipped with steel screw feed plugs. In addition, centers are made of hardened drill rod, and a double thrust bearing on the lower gear takes the thrust both forward and reverse—with a thrust take-up for wear.

Right and left hand spiral gears are available for drilling right and left hand corners. A new design will soon allow tools to be used with drills with as little as a ¾-in. taper.

Process Timing Mechanism

Taylor Instrument Companies, Rochester 1, N. Y., has announced that its process timing mechanism for Fulscope temperature or pressure controllers, production of which was suspended shortly after the beginning of the War, is available again. The device,



built into either the single duty Fulscope recording temperature or pressure controller, functions as follows: Adjust instrument manually for desired time period; timing begins when apparatus reaches desired control point, process ends automatically at end of timed period.

Water Soluble Coumarone Emulsion

The Nevelle Company, Pittsburgh, Pa. has announced a water soluble coumarone-indene resin emulsion. This emulsion, designated as *Nevilloid C-55* and believed by the manufacturer to be the first coumarone-indene emulsion offered commercially, will stand dilution with water and exhibits resistance to break by freezing. Its film is continuous and cohesive and will withstand considerable flexing.

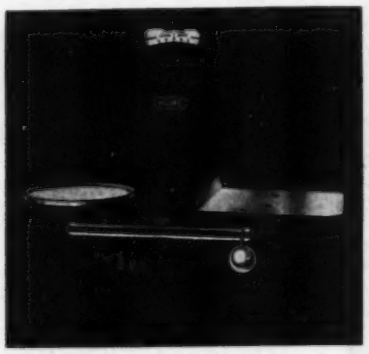
The emulsion can be incorporated with latices of natural rubber, GR-S or Hycar OR without prior dilution or without causing coagulation of the rubber by the addition of a 10% aqueous sodium hydroxide solution in an amount sufficient to give a *p*H of 10. Without the use of sodium hydroxide in the amount specified, it is possible to incorporate the emulsion with latices only if the solids content of each emulsion is reduced to 10% by weight by dilution with water.

Nevilloid C-55 blends with alkyd resin emulsions of various types without pre-treatment, uniform although somewhat opaque films being obtained. It is usable with emlusions of paraffin wax, carnauba wax, and Hydrowax. Melamine resin emulsions, like Beckamine P-2, give clear films.

Nevilloid C-55 can be used with sodium silicate solutions. In general, it is miscible with all oil-in-water type emulsions and would yield uniform films with emulsions of materials which are ordinarily compatible with coumarone-indene resins.

Predetermined Weighing Scales

The Howe Scale Company, Rutland, Vermont, has announced a new line of predetermined weighing scales. In addition to packaging, these scales can be used for



checkweighing, balancing, counting, and compounding.

The models offered cover a variety of shapes, capacities, and commodity platter sizes. They are all claimed to be of exceptionally sturdy construction, fast-performing and accurate.

Electromagnet for Removing Iron from Pulp or Paper Stock

Dings Magnetic Separator Company, 509 East Smith Street, Milwaukee, Wis., has announced an electromagnet of rectangular design for removing miscellaneous tramp iron from pulp or paper stock. Available

in a variety of sizes to suit the capacity requirements of the installation, the magnet is waterproof, requires no attention other than cleaning from time to time, and operates on direct current. Where no

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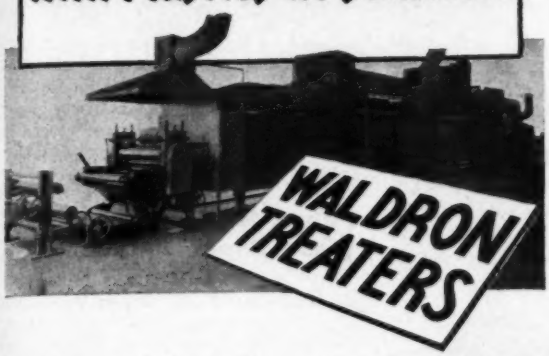

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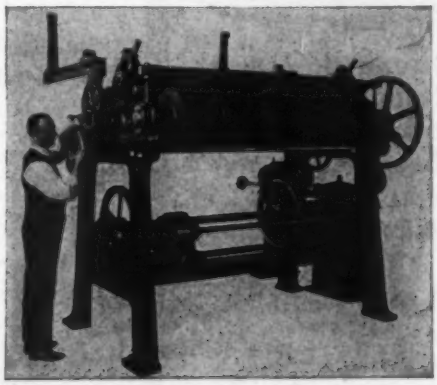

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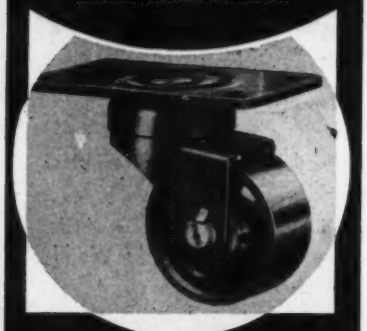

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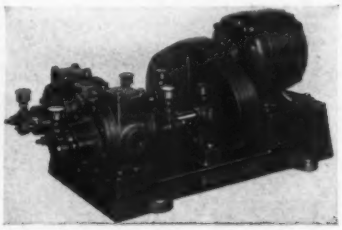
d-c is available, electronic tube rectifiers are used.

In the accompanying installation view, the maget is mounted face upward between a pulp storage tank and a pump. The pipe coming from the tank is flanged out into a rectangular shape and the magnet installed below this enlargement.

Tramp iron present in the stock passing through the pipe line is held firmly to the face of the magnet. Approximately twice a day or more if need be, depending on the amount of iron present in the stock, the face of the magnet is exposed and the tramp iron is removed manually.

Twin Pumping Unit

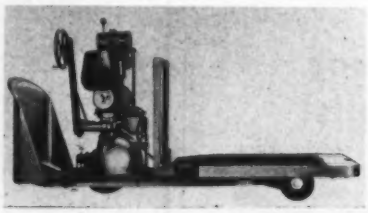
Blackmer Pump Company, Grand Rapids, Mich., has announced a twin pumping unit for the handling of fuel oil, lube oil, and similar liquids. The capacity of each pump is 3 gpm at a discharge pressure of 100 psi.



The pump speed is 570 rpm. Both pumps are mounted on a cast bedplate and connected through semi-enclosed reduction gears to an electric motor. Pump constructions available are all-iron, bronze-fitted or all-bronze.

New Design of Industrial Truck

A gasoline-operated skid truck of one-ton capacity and embodying a number of new features in design has been announced by Yard-Man Inc., Jackson 65, Mich. Among the novel features of its design are: a patented two-speed drive; large ball thrust bearing equipped steering mechanism; sensitive fly-ball type governor; four-inch tread load wheels; gas tank of



one gallon capacity (full tank provides sufficient fuel for eight hours of normal operation); and "V" type belt brakes which set automatically when the machine is not in action.

The low-speed of the two-speed drive is adapted for starting, climbing ramps, going in and out of freight cars or other tight places, and for moving material over rough floors. The high speed is available for movement of light loads or for travel without loads.

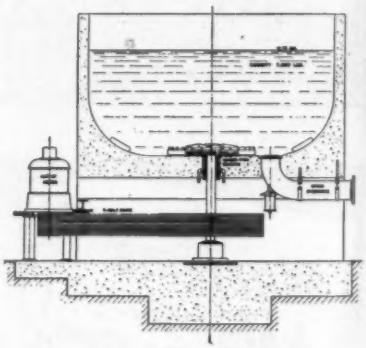
The large ball thrust bearing used in connection with the steering mechanism makes for improved steering with little steering effort. The fly-ball type governor is enclosed, the entire unit being sealed so that operator cannot disturb it without breaking the seal.

Heat—and Chemical-Resistant Thermoplastic

A new thermoplastic, *Cerex*, has been announced by Monsanto Company, St. Louis 4, Mo. This plastic combines high resistance to heat with resistance to strong, corrosive chemicals, excellent electrical insulating properties, and high rigidity and strength. It has a heat distortion point above the boiling point of water. The plastic is readily moldable in standard molding machines.

Pulper for Pulp or Waste Paper

Kurt Wandel, Honey Brook, Pa., has announced the *Wandel Pulper* for tearing up and disintegrating pulp or waste paper. The body of the pulper is of reinforced concrete shaped in the form of a bowl and with a tunnel going through the center of the base. The tunnel permits the impeller, which is made up of disintegrating vanes welded to a heavy steel plate, and which is located in the bottom of the bowl, to be connected through a vertical shaft and V-belt drive to a vertical motor.



The pulper may be operated either as a batch unit or with a continuous discharge arrangement. A unit with a 14-foot inside-diameter bowl, according to the announcement, will tear up and disintegrate four tons of pulp or waste paper per hour with only 100 hp.

Protective Skin Creams

Two types of protective skin creams, designated as Clad, have been announced by The B. F. Goodrich Company, Akron, Ohio. One type is for dry working conditions; the other, for wet.

The cream for dry working conditions has been made as nearly neutral to the skin as possible to eliminate skin drying or any tendency to cause burning or irritation even under prolonged usage. It protects the skin against dirt, grease, grime and other hard-to-wash-off substances.

The cream for wet use is made for protection of the skin where water and other dilute aqueous and mild chemical solutions are present.

Both the wet and dry types leave the skin soft and smooth after the cream is removed.

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TECHNICAL DEVELOPMENTS

These abstracts are of the latest developments found in the American and foreign press.

Bleaching of Kraft Pulps

(This abstract is a continuation of that given in THE PAPER INDUSTRY AND PAPER WORLD *26,* No. 2, 250-251). The authors use the term "excessive chlorination" (*Ueberchlorierung*) in the sense that the pulp is given a five-minute treatment with an excess of chlorine, which is normally followed by a hot caustic soda treatment (3% based on the weight of dry pulp) and a subsequent hypochlorite bleach. By using 9% elementary chlorine and 1% hypochlorite-chlorine, pulps of high whiteness and very good strength properties were obtained. Often optimum conditions were obtained when the intermediate alkaline treatment was carried out with 1.2% caustic soda. The following sequence of bleaching operations proved economical: (a) elementary chlorine (not excessive), (b) washing with water, (c) "excessive chlorination", and finally (d) alkalization with calcium hydroxide. The latter may satisfactorily replace caustic soda.

The final hypochlorite bleach (if used) may advantageously be split into two stages with an intermediate wash with hot, dilute caustic. Pulps bleached in this way were strong and white. The use of sulphur dioxide as an antichlor (cf. Rue, U. S. Patent 1,771,064) showed little advantage. Bleaching with hypochlorite, prior to excess chlorination as suggested by Sunesson (U. S. Patent 2,083,280) showed no improvement over the methods used by the present authors. The introduction of a hypochlorite bleach into the stage that involved elementary chlorine, lowered the strength quality number (defined in the previous abstract).

The authors examined various commercial multiple stage bleaching processes (including those of Rue and Sconce, Sunesson, Thorne, and Löschbrandt) and applied them all to one special kraft pulp so that the effects could be compared and evaluated. The results are given in tables and were critically studied. Of these methods now in practice, that of Rue and Sconce gives pulps with the greatest whiteness, strength, and degree of polymerization. With this pulp, the present authors reached the highest strength quality number by using the following successive steps: (chemicals being computed as % of the weight of oven dry unbleached pulp—or, in the case of hypochlorite or chlorite, in terms of active chlorine in the chemical, % based on dry pulp)—(1) 10% elementary chlorine and 13.54% caustic soda, (2) 0.5% sodium hypochlorite, (3) 3% hot caustic soda, and (4) 0.5% sodium hypochlorite. The pulp with the highest over-all quality number (95.5%) was obtained in the following series of steps: 4.5% chlorine, (2) (4.5% chlorine and 7.05% calcium hydroxide), (3) 1.5% caustic soda, (4) 0.5% sodium chlorite, (5) 1.5% caustic soda, and (6) 0.5% sodium chlorite. This final reagent enhances the brightness markedly. However it does not improve the strength properties of the pulp. Newer blueing agents (like "Blankophor" and "Ultrasan") do not relieve the mill man from the necessity of producing well-bleached pulps, because these agents are most effective with pulps of high whiteness. G. Jayme and L. Rothamel. Cellulosechem. 20, 97-102 (1942), through Chemisches Zentralblatt 114, II, No. 17, 1606 (1943); and Cellulosechem. 21, 7-14 (1943).

Technical Methods for Producing Wood Rosin

Statistical data are given on the rosin production in Germany, Austria, Greece, and the U.S.S.R. and conflicting views regarding the advisability (or inadvisability) of extracting wood rosin are discussed. Experiments were carried out with a 60-year old pine, freshly felled, and dried without storage, and also with commercial pine chips. Indications are that it is economically inexpedient to pre-extract the wood, and that the resins are best recovered from the skimmings after the sulphate cook. Although the wood showed benzene

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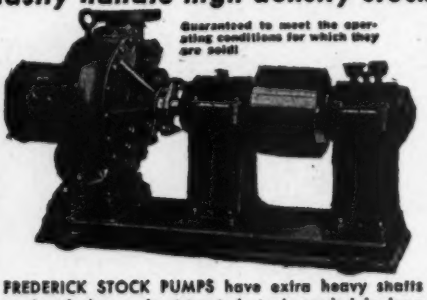

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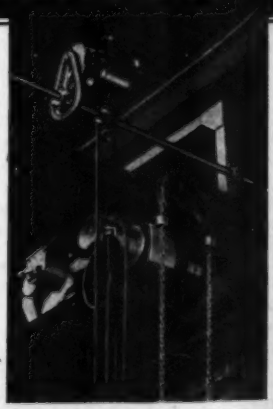

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extracts of 4.1-5.2%, the heartwood of the pine contained 11.5% solid extract (containing 62% of resin acids) and the sapwood contained only 2.5% of a liquid extract (which yielded 34% resin acids). The commercial pine chips contained only 3.3% of benzene extract and gave 30 kilos of tall oil per ton of pulp in an experimental cook. However about 60% of the original benzene extract was not recovered in the tall oil and this represents material that cannot be salted out with the sulphate soap skimmings.

After removal of the skimmings from the black liquor, the latter was acidified and extracted exhaustively with ether. Thus a further amount of extractive was isolated, which, when added to that found in the sulphate soap skimmings, accounted for about 3.1% of the weight of the chips used in the cook or about 90% of the original extractive. The benzene-insoluble "hydroxy-acids" in tall oil represent only about 2-6%, whereas in the original pine chip (benzene) extract they accounted for about 25%. It is this fact which suggests the inadvisability of pre-extracting wood prior to the cook to recover the resin. Such pre-extraction evidently gives acids that cannot be included among the resin acids—and an appreciable part of these are absent in the tall oil. Analytical data are given for a number of pines. In trees from Northern Sweden, the fatty acids predominate. In the German pines the resin acids are dominant. Of the total fatty acids, about 12% was lignoceric. Various methods of purifying the resin acids are given, both in extracts and in tall oil. W. Sandermann. Cellulosechem. 21, 25 (1943).

Bleaching Sulphate Pulps

A study was made of the chlorination of sulphate pulp and the effect of subsequent alkali treatment, in which the course of the reaction was followed by permanganate consumption and also by viscosity determinations on the pulps. Whereas the lignin removal is facilitated by increasing the amount of chlorine in the liquors, the cellulose is damaged. The first minutes of treatment cause the rapid removal of lignin. Thereafter the removal is slow. Increase in temperature augments the removal of lignin, but increases the degradation of the cellulose, which is less degraded by actually lowering the temperature. The first few minutes of chlorination which removes lignin also is deleterious in that it actively damages the cellulose due to the chlorine concentration. The time used for bleaching should be regulated by the excess of chlorine present. Easy-bleaching pulps may be subjected to relatively long bleach periods when only small excesses of chlorine are present; but in kraft pulps, where a considerable excess is present, short bleaching periods must be maintained. When the Roe chlorine number is high, the removal of lignin by chlorination is less effective. The lignin removal is enhanced by treating with hypochlorite before chlorination and the method works well for pulp the chlorine consumption of which is high. The removal of chlorolignins is facilitated by adding NaOH or NH_4OH, the removal increasing with increasing addition until the pulp is alkaline, after which the rate of removal diminishes. Up to a *p*H of 9, lime serves to dissolve the chlorolignin, but above this point the reaction not only ceases—it may actually be reversed due to the precipitation of insoluble calcium compounds on the pulp. The chlorolignin removal also takes place very rapidly at the early stage of treatment, but starts to decrease after the first few minutes. Temperature increase facilitates the removal when either sodium hydroxide or ammonia are used. The opposite is true for lime. Slight damage is done to the cellulose by alkaline treatments. The effect is most pronounced with lime, less so with NaOH and quite negligible with NH_4OH. Fritz Hedborg. Svensk Papperstidn. 46, 381-94 (1943); cf. C. A. 38, 483-4 (1944).

South African Woods Pulped by the Pomilio Process

Experiments were conducted with four South African pines (*P. patula, P. taeda, P. insigne,* and *P. pinaster*) and with a eucalyptus and a species of acacia. The pulps were satisfactory, especially the two latter. Eucalyptus gave 48% and acacia 54% pulp yields. Angelo Cittadini. Oesterr. Chem. Ztg. 45, No. 17, 193-201 (1942); through Bull. Inst. Paper Chem. 14, No. 9, 270 (1944).

PAPERMAKING PATENTS

IN THE UNITED STATES—Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington 4, D. C.

Continuous Freeness Recording Method and Means

Patent No. 2,346,746. Arthur Brooks Green, Needham, Mass., assignor to Paprex Company, Wakefield, Mass., a corporation of Massachusetts. Application March 3, 1941. Serial No. 381,419. 15 Claims. (Cl. 73—51). 1. Means for testing and recording the freeness of paper stock, comprising a constant level flow box containing paper stock to be tested, an immersion type freeness tester, means for recording the result of each test made by said freeness tester on said paper stock, and means for periodically and uniformly immersing said freeness tester into said paper stock and then withdrawing it from said stock after each test has been recorded.

Impregnated Paper

Patent No. 2,314,820. Sumner C. Fairbanks, Passaic, N. J., assignor to The Hamersley Manufacturing Company, Garfield, N. J., a corporation of New Jersey. No Drawing. Application September 9, 1939. Serial No. 294,095. 3 Claims. (Cl. 117—155). 1. Paper of enhanced wet strength and wet-rub properties, whose fibres are thoroughly impregnated with a waterproof mixture consisting essentially of a carrier medium selected from the class which consists of paraffin and petroleum, and a condensation derivative of rubber obtained by treating rubber in solution with chlorostannic acid or a halide of an amphoteric metal, said impregnating mixture being present in the paper in an amount no greater than about ten percent of the weight of the paper.

Coating Flexible Webs

Patent No. 2,325,798. Laurence W. Porter, Westbrook, Maine, assignor to S. D. Warren Company, Boston, Mass., a corporation of Massachusetts. Application June 3, 1940. Serial No. 338,661. 3 Claims. (Cl. 117—68). 2. Method of coating a paper web as the same is being continuously advanced, which comprises applying to one side of the web a controlled quantity of a fluid coating composition comprising a liquid and a suspended solid, spreading the composition into a smooth and even layer on the web by means of an air jet while firmly supporting the reverse side of the web, applying suction to said reverse side of the web whereby to withdraw excess liquid from the coating layer into the interior of the web and to set the coating to a damp but non-mobile condition, promptly thereafter applying to the reverse side of the web a controlled quantity of fluid coating composition, spreading the composition into a smooth and even layer on said reverse side of the web by means of an air jet while firmly supporting the first coated side of the web carrying the set but still damp coating layer, and drying the so-coated web.

Chemical Treatment of Paper

Patent No. 2,322,887. George L. Schwartz, Wilmington, Del., and Joseph F. Walker, Lewiston, N. Y., assignors to E. I. du Pont de Nemours & Company, Wilmington, Dela., a corporation of Delaware. No drawing. Application October 15, 1940. Serial No. 361,268. 6 Claims. (Cl. 117—155). 2. The process which comprises treating a paper web with an aqueous starch dispersion and containing a water-soluble methylol-melamine in an amount of from 1 to 25 parts per 100 parts of starch, a polyvinyl alcohol in an amount of from 1 to 25 parts of polyvinyl alcohol to 75 parts of starch and an ammonium salt of a mineral acid, and then heating said treated paper web to such a degree as to cause an insolubilizing reaction between the starch and the methylol-melamine.

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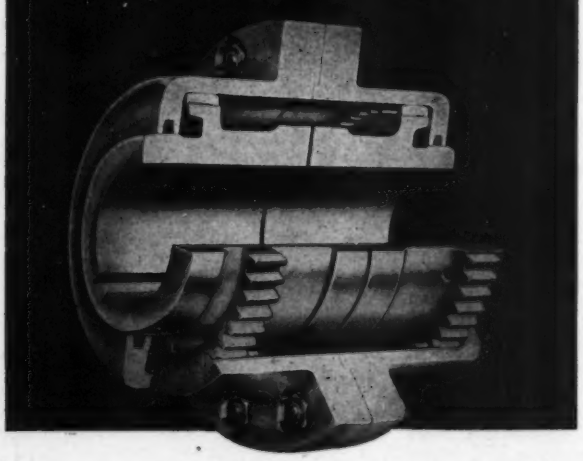

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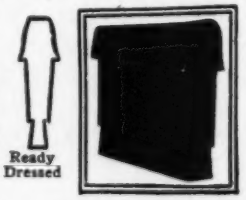

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Process for Imparting Greaseproof Characteristics to Paper

Patent No. 2,317,696. Edward D. Rich, Tacoma, Wash. No drawing. Application May 13, 1942. Serial No. 442,852. 1 Claim. (Cl. 117—86). Process for imparting greaseproof characteristics to paper which comprises coating paper first with a water solution containing 5 to 20%, by weight, of a reduced viscosity starch, 1.0 to 10.0%, by weight, of glycerine, and 0.5 to 2%, by weight of a methyl ether of cellulose which is soluble in water; thereafter drying the paper, applying on the same side of the paper a water solution containing 1 to 10%, by weight, of a methl ether of cellulose which is soluble in water and 1.0 to 5%, by weight, of glycerine; and thereafter drying the paper.

Apparatus for Measuring the Water Resistance of Paper

Patent No. 2,329,959. Johannes A. Van den Akker, Appleton, Wis., assignor to The Institute of Paper Chemistry, Appleton, Wis., a corporation of Wisconsin. Application March 15, 1940. Serial No. 324,106. 6 Claims. (Cl. 73—51). 1. In a device for measuring the liquid resistance of paper, the combination of a paper sample support, a source of ultra-violet light mounted above and directed towards said support, a vessel movably mounted beneath said support and adapted to be raised so that water contained in said vessel may be brought into contact with the bottom side of a paper sample mounted in said support, a photocell mounted above said support in such manner as to receive fluorescent light emitted by said paper sample, an optical filter mounted between said support and said photocell and adapted to permit substantially only fluorescent light to pass therethrough, and a galvanometer in circuit with said photocell.

Apparatus for Determining the Tendency of Paper to Shrink

Patent No. 2,326,088. George S. Witham, Jr., Hudson Falls, N. Y., assignor to W. & L. E. Gurley, Troy, N. Y., a corporation of New York. Application December 12, 1940. Serial No. 369,782. 8 Claims. (Cl. 73—51). 1. In a device of the character described for determining the shrinkage which may occur in paper, a first means for gripping a strip of paper in a zone thereof and for suspending said strip, a second means adapted to be fastened to said strip of paper in a zone thereof spaced from said first mentioned zone and to be supported by said strip, movable means adapted to be operatively associated with said second means for indicating the movement thereof, means for spacing said first and second gripping means a predetermined distance apart while the paper is operatively fastened therebetween, means for separating said last mentioned means and said second means whereby said paper will be freely suspended from said first means and for operatively associating said second means with said indicating means.

Coated Glassine Paper

Patent No. 2,325,408. Toivo A. Kauppi and Roger W. Kolderman, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich., a corporation of Michigan. No drawing. Application August 5, 1942. Serial No. 453,720. 9 Claims. (Cl. 117—86). 1. The method which includes: precoating a glassine paper sheet with an aqueous emulsion of an ethyl cellulose lacquer; volatilizing water and volatile solvents from the pre-coated sheet; and coating the dried sheet with a low viscosity ethyl cellulose melt.

Treatment of Paper and Paperboard

Patent No. 2,325,624. Sidney Musher, New York, N. Y., assignor to Musher Foundation, Incorporated, New York, N. Y., a corporation of New York. No drawing. Application March 11, 1940. Serial No. 323,298. 6 Claims. (Cl. 8—115.5). 2. Antioxygenic paper and paperboard containing incorporated with the surface thereof between about 0.2% and 5% of deoiled spice residue, said deoiled spice residue having been reacted with the surface of the paper and paperboard by heating the same to at least about 220° F., said paper and paperboard having a *p*H of between about 4 and 6.9.

New Catalogues and Publications

Eutectic Welding Alloys Company, 40 Worth Street, New York 13, N. Y.—A four-page bulletin on the "Theory of Soldering, Brazing and 'Low Temperature' Welding" which will be of interest to plant personnel, managers, or engineers who deal with problems in maintenance or production welding, has been prepared by the above company. The leaflet tells of the discovery of the "Eutectic" process, the latest innovation in the field of metal joining, reclamation and fabrication. It also explains how the "Eutectic" welding alloy is deposited on the parent metals at low temperature; gives various definitions relevant to the new process, and covers different applications. Free copies are available on written request on firm letterhead, addressed to Engineering Department, Room 1113, Eutectic Welding Alloys Company, 40 Worth Street, New York 13, New York. Welding supervisors may obtain limited supplies to distribute to their workers.

The Farval Corporation, 3250 E. 80th Street, Cleveland, Ohio.—Just off the press is a bulletin, "Aloft is no place for A. W. O. L. (absent without lubrication) bearings." It explains the application of the Farval Dualine system for sending lubricant under pressure from a central pumping unit to every bearing on the machine, and emphasizes the safety obtained with the Farval method. A page of Farval system applications concludes the bulletin.

The B. F. Goodrich Company, Akron, Ohio—With the present widespread interest in plastics, the new technical bulletin PM2 on its Geon vinyl resins and plastics for calender and solution processing issued by the Chemical Division of this company, will be welcomed by many. The four-page booklet describes the Geon vinyl chlorides polymers and copolymers, in resin as well as plastic form, and gives plasticizer and stabilizer tables for use in combination with the resins. It also discusses fillers and pigments, and lists typical formulations for the calender, spread or dip processes. Mixing and milling, calendering and general aspects of solution coating with the resins are also discussed. Write Chemical Division, B. F. Goodrich Company, Rose Building, Cleveland 15, Ohio.

The B. F. Goodrich Company, Akron, Ohio—Available on request is a new catalogue section 9160, listing and discussing the company's various types of adhesives and cements, as well as the service requirements and classifications of each type. Included are instructions on application and data on the company's standard containers, with approximate shipping weights.

G. D. Jennsen Company, 103 Park Avenue, New York 17, N. Y.—Strikingly illustrated is a bulletin issued by this company, describing its two-tower acid system for the sulphite pulp industry. Included are lists of two-tower acid systems in operation and also pressure tower installations.

Leeds and Northrup Company, Philadelphia 44, Pa.—Latest specifications on instruments for making precise conductivity measurements in plant, laboratory and class room, will be found in Catalogue EN-95, 1944 Edition, which may be had by addressing this company at 4934 Stenton Avenue. In addition to data about methods of measurement and notes for selection and use of the apparatus, there is illustrated and described a signalling conductivity controller and several new industrial cells which have just become available.

Link-Belt Company, Chicago — Write to this company for Book No. 1915, describing and illustrating the various types of its "100" belt conveyor idler. The tables of list prices, dimensions in inches and weights in pounds will be of great assistance to those interested in the purchase of such equipment.

Metallizing Company of America, 1139 West Congress Street, Chicago 7, Ill.—A four-page bulletin with complete information on the new Mogul Nervous Weld Process for salvaging of defective aluminum castings, also bronze, gray iron, malleable and steel castings, may be had from the above company, by asking for Bulletin No. 16. In addition to a description of the new Mogul Nervous Weld Pistol and price list, other uses for this process are also outlined.

National Adhesives Division, National Starch Products, Inc. 270 Madison Avenue, New York 16, N. Y.—A new booklet, "The What, Where, Why, How of RESYN Adhesives" may be obtained by writing to any of the National Adhesives' offices throughout the country, or by addressing headquarters at 270 Madison Avenue, New York 16, New York. In 16 pages, written in non-technical language, and printed in two colors, the development of synthetic resin is traced, trade terms are defined, properties described, applications suggested and procedures outlined for handling the various types. Such an explanation of plastics, and what they can be expected to do now and in the postwar period, should be of great interest.

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Books

Chemical Engineering Nomographs—Written by Dale S. Davis, Mathematician, Wyandotte Chemicals Corporation, this book brings together a selection of nomographs of the author as well as of other authors. The selection has been critical; and the grouping has been according to subjects. All charts have been reproduced sufficiently large to be read easily. They also are supplemented with corroboratory material and with directions for use.

One chapter is devoted specifically to nomographs of interest to the paper industry. Many of the nomographs in the other 18 chapters of the book are of related interest. There are, for example, acid nomographs, pH nomographs, and nomographs on boiling point corrections and elevations; thermal conductivities of gases, vapors, liquids, and wood; distillation, evaporation and extraction; flow of fluids; freezing point and freezing time; fuel analysis and thermal value; heat transfer; vapor-pressure-temperature—concentration; horizontal tanks; viscosity; and others.

The book totals more than 300 pages; is bound attractively and durably in stiff cloth cover; and is priced at $3.50 a copy by McGraw-Hill Book Company, Inc., 330 West 42nd St., New York 18, N. Y., the publisher.

The Chemistry of Cellulose—Written by Emil Heuser of The Institute of Paper Chemistry, this book is a compendium and critical digest of the literature of the chemistry of cellulose with consideration of the microscopic and submicroscopic structure of the cellulose fiber. Emphasis is laid on the scientific aspect rather than on the practical application of cellulose chemistry. Following an introductory chapter, the succeeding chapters treat of such subjects as Morphology of the Fiber and Composition of the Cell Walls; Reactions of Cellulose with Water, with Aqueous Alkalies and with Organic Bases, Ammonia and Concentrated Salt Solutions. Action of Cuprammonium Hydroxide on Cellulose; Cellulose Esters, X anthates and Ethers; Oxidation of Cellulose; Decomposition of Cellulose by Acids, Heat, and Biological Processes; Chain Structure of Cellulose; and Molecular Weight of Cellulose. The book also contains both an extensive author index and a subject index. Bound in a red cloth cover with backbone printing in gold and totaling 660 pages, the book is priced at $7.50 a copy by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y., its publisher.

Manual of A. S. T. M. Standards on Refractory Substances, Fifth Edition—This work includes new standards for air setting refractory mortars; fireclay plastic refractories both for boiler and incinerator services; methods of test for measuring the shrinkage, spalling and workability index of fireclay plastic refractories, and a method for measuring the thermal conductivity of insulating fire brick. The book contains seven specifications on refractories for various types of service. There are two classifications of material and the remaining 16 standards give widely used methods of testing; some for fireclay refractory brick, others for fireclay plastic refractories, some for insulating fire brick and others for various types of refractory materials. Tests for determining P. C. E., permanent linear change, cold crushing strength, warpage porosity and true specific gravity are included. An important contribution to the literature in this field is the group of industrial surveys which describe the operations carried out in the furnaces, the types of refractories used in them, and outline the conditions which affect the life of the refractories. Other data in the manual covers standard samples of refractory materials for chemical analysis and for pyrometric cone equivalent. The book is published by the American Society for Testing Materials, 260 Broad Street, Philadelphia 2, Pa. Price is $1.50, heavy paper cover, or cloth, $1.75. Reduced prices on quantities.

Safety in Electric and Gas Welding and Cutting Operations—Published by American Standards Association, 29 West Thirty-ninth Street, New York 18, N. Y., this 32-page paper-covered booklet, one of a series of American War Standards, is intended as a guide for the protection of workers from injury and illness and for the protection of property from fire or other damage arising out of the installation, operation, and maintenance of electric and gas welding and cutting equipment.

The pamphlet is divided conveniently into seven major sections: namely, Definitions, Installation and Operation of Gas-Welding and Gas-Cutting Equipment, Installation and Operation of Arc-Welding and Arc-Cutting Equipment, Installation and Operation of Resistance-Welding Equipment, Fire Prevention, Protection of Personnel, and Ventilation and Health Protection. The price of the booklet is 40 cents a copy.

CURRENT MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

OPA ceiling prices in sales to consuming mills delivered buyer's usual receiving point, with brokers' allowance not in excess of 5 per cent:

	per cwt.
Blue Overalls	-5.50
Corduroy, Men's	-3.50
Corduroy, Ladies'	-3.00
Washables, No. 1	-3.00
Percales	-4.75
New Soft Blacks	-3.75
Light Prints, No. 1	-4.50
Khaki Cuttings—	
Bleachable	-4.25
Unbleachable	-3.50
New White Canvas	-6.50
New Mixed Blacks	-3.25
Canton Flannels, Bleached	-7.00
Shirt Cuttings—	
New White No. 1	-7.25
No. 1 White Headings	-7.25
White Shrunk	-5.00
Silesias No. 1	-5.75
New Unbleached	-7.50
Fancy	-3.50
Linen Cuttings—	
American	-5.00
White	-14.00
Grey	-14.00

RAGS (Domestic)

f. o. b. New York City

OLD RAGS

OPA ceiling prices in sales to consuming mills f. o. b. cars at points of shipment, with brokers' allowances of $1 to $2 a ton depending on the value of the grade involved.

Roofing—	per ton
No. 1	31.00
No. 2	29.00
No. 3 and No. 4	27.00
Twos and Blues—	
Repacked	44.00
Thirds and Blues—	
Repacked	44.00
Miscellaneous	36.00
Whites, No. 1—	
Repacked	76.00
Miscellaneous	64.00
Whites, No. 2—	
Repacked	58.00
Miscellaneous	53.00

RAGS (Foreign)

ex dock New York City

NEW RAGS — per cwt. — Nominal

- New Dark Cuttings
- New Mixed Cuttings
- New Light Silesias
- Light Flannelettes
- Unbleached Cuttings
- New White Cuttings
- New Light Oxfords
- New Light Prints

RAGS (Foreign)

ex dock New York City

OLD RAGS — per cwt. — Nominal

- No. 1 White Linens
- No. 2 White Linens
- No. 3 White Linens
- No. 4 White Linens
- No. 1 White Cottons
- No. 2 White Cottons
- No. 3 White Cottons
- No. 4 White Cottons
- Extra Light Prints
- Ord. Light Prints
- Med. Light Prints
- Dutch Blue Cottons
- French Blue Cottons
- French Blue Linens
- Checks and Blues
- Linsey Garments
- Dark Cottons
- Old Shoppers

ROPE and BAGGING

f. o. b. and ex dock New York City

Gunny No. 1—	per cwt.
Foreign	Nominal
Domestic	2.75 to 3.00
Wool Tares—	per cwt.
Light	2.75 to 3.00
Heavy	3.00 to 3.25
No. 1 Scrap Bagging	2.50 to 2.75
Manila Rope—	
No. 1 large	-*115.00
No. 1 small	-*105.00
Sisal Rope—	
No. 1 large	-*95.00
No. 1 small	-*80.00
New Burlap Cuttings	5.50 to 6.00
Jute Threads—	
Foreign (Nom.)	6.25 to 6.75
Domestic	5.50 to 6.00
Strings—	
No. 1 sisal	-*80.00
No. 2 sisal	-*60.00
Soft jute	5.00 to 5.50
Mixed	1.50 to 1.75

*OPA ceiling price per ton f. o. b. shipping point.

WASTE PAPER

OPA ceiling prices f. o. b. points of shipment, with brokers' allowance of 4 to 9 per cent.

Shavings—	per ton
White Env. Cuts, One-Cut	67.50-
Hard White Env. Cuts	62.50-
Hard White, No. 1	57.50-
Soft White, No. 1	50.00-
Soft White, One-Cut	57.50-
Soft White, Misc.	43.00-
Fly Leaf, No. 1	33.50-
Fly Leaf, Woody, No. 1	25.00-
No. 2 Mixed Col. Woody	18.00-
Flat Stock—	
Repacked No. 1 Heavy Books and Magazines	33.50-
Mixed Books	17.00-
Ledger Stock—	
No. 1 White	42.50-
No. 1 Mixed (Colored)	37.50-
Manilas—	
New Env. Cuttings	53.00-
New Env. Cuts, One-Cut	57.50-
Extra Manilas	37.00-
Manila Tab Cards, Free of Ground Wood	45.00-
Ground Wood Manila Tab Cards	27.00-
Kraft—	
Envelope Cuttings	65.00-
Mixed Env. or Bag Cuts	55.00-
Tripled Sorted No. 1 Brown	50.00-
New 100% Cor. Cuts	45.00-
No. 1 Old Assorted	35.00-
News—	
White Blank	33.00-
Overissue	17.00-
No. 1 Baled	15.00-
Old Corrugated Containers	23.00
New Corrugated Cuts	18.00-
Mill Wrappers	17.00-
Box Board Chips	14.50-
No. 1 Mixed Paper	14.00-

CHEMICALS

f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.25-
Ground, cwt.	4.00-
Powdered, cwt.	4.40-
Blanc Fixe—	
Pulp, bulk, ton	40.00 to 46.50
Dry, barrels, pound	60.00 to -
Bleaching Powder—	
Drums, cwt.	2.25 to 3.10
Casein (Domestic Standard)—	
30-30 mesh (bags), lb.	24.00 to 24.75
80-100 mesh (bags), lb.	—
Argentine, lb.	18.50 to 20.50
China Clay—	
Domestic Filler Bulk (mine) ton	7.50 to 15.00
Domestic Coating Bulk (mine) ton	11.00 to 22.00
Imported (ship side) Bulk (lump) ton	14.00 to 26.00
Chlorine—	
Tank cars (wks) cwt.	2.00 to 2.25
Gelatine (silicin), lb.	.90 to .95
Glyc. (C.P.) drums, lb.	18.25 to 18.50
Litharge, powd., bbl., lb.	.09 to -
Rosin (Gum)—	
New York, per 100 lbs.	
E	6.55-
F	6.60-
G	6.65-
WW	7.40-
Rosin (Wood), carlots	4.18-
Salt Cake—	
Dom. bulk (wks) ton	15.00 to 16.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	20.00 to
Soda Ash—	
Bulk (works), cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.35
Barrels, cwt.	1.05 to 1.35
Soda (Caustic)—	
Solid, drums, cwt.	2.30 -
Ground and flake, drums, cwt.	2.70 -
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.05
40 deg., 35 gal. drums, (works) cwt.	.80 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	3.72-
Pearl, barrels, cwt.	3.83-
Paper (Sp.) bags, cwt.	3.83-
barrels, cwt.	3.92-
Sulphur (crude)—	
(mine) bulk, long ton	16.00 to ——
Talc—	
Dom. 100 lb. bags (mine) ton	16.00 to 21.00
Imp. bulk, ton (Nom.)	—
Titanium Dioxide—	
Barium Pig., bbls., lb.	.05¾ to .06
Calcium Pig., bbls., lb.	.05 to .05¼
Zinc Sulphide, bbls., lb.	5.60 to 5.85

WOOD PULP

OPA maximum prices applicable to wood pulp delivered to consumer mills located East of the Continental Divide exclusive of Denver, Colo. (West of the Continental Divide and in Denver, Colo., ceilings are $6 per ton lower):

Bleached softwood sulphite	86.00
Unbleached softwood sulphite	74.00
Bleached hardwood sulphite	83.50
Unbleached hardwood sulphite	71.50
Northern bleached sulphate	86.00
Southern bleached sulphate	79.00
Northern semi-bleached sulphate	82.00
Southern semi-bleached sulphate	75.00
Northern unbleached sulphate	73.00
Southern unbleached sulphate	63.50
Bleached soda	72.00
Unbleached soda	68.00
Groung wood pulp	50.00
Ground wood—paper machine dried and mutilated	53.00
Sulphite screenings	43.50
Sulphate screenings	38.00
Ground wood screenings	32.00
Northern unbleached sulphate siderurus	73.00
Southern unbleached sulphate siderurus	63.50
Standard news print siderurus	50.00

PAPER

f. o. b. New York City

Boards—	per ton
Binders	84.00-
Chip	48.00-
Chip, tube and can	50.00-
Chip, full-bending	52.50-
Chip, sgl. mla. lined	60.00-
Coated, white patent .016	80.00-
.020 and heavier	75.00-
Kraft liner	62.00-
News	48.00-

Book Papers—OPA base maximum prices per cwt. 4 cases or equivalent, f. o. b. mill with quantity, weight, manufacturing and other differentials allowed:

Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	8.25
B Grade E. F.	7.80
C Grade E. F.	7.55
D Grade E. F.	7.30
E Grade E. F.	7.05
No. 2 Uncoated Offset 4 sides. White	8.45

Coated White (Trimmed 4 sides)

No. 1 Glossy	11.90
No. 2 Glossy	10.85
No. 3 Glossy	10.15
No. 4 Glossy	9.80
No. 5 Glossy	9.30
C2S Offset	10.40
C1S Litho (Varnish)	10.05
C1S Litho (Non-Varnish)	9.80

Writing Papers—OPA base maximum prices per cwt. on writing papers, f. o. b. mill with some, quantity, packing and other differentials allowed:

Rag Content Bond—	per cwt. 20 lb.	16 lb.
Extra 100% Rag	34.00	34.00
100% Rag	28.00	28.00
75% Rag	20.00	20.00
50% Rag	16.00	17.25
25% Rag	14.00	15.00

Rag Content Ledger—	per cwt. Zone 1
Extra 100% Rag	30.00
100% Rag	28.00
85% Rag	26.00
75% Rag	21.00
50% Rag	17.00
25% Rag	13.00

Sulphite Bond—	per cwt. 20 lb.	16 lb.
Air dry, watermarked	12.75	13.70
No. 1 (M. F.) watermarked	9.00	9.70
No. 2 (M. F.) watermarked	8.25	8.85
Plain (M. F.) unwatermarked	7.60	8.20

Sulphite Ledger—	per cwt. Zone 1
No. 1 (M. F.) watermarked	10.00
No. 2 (M. F.) watermarked	9.25
Plain (M. F.) unwatermarked	8.60

Glassine (f. o. b. mill)—	per cwt.
Embossed (25 lb. up)	13.75 to 14.25
Bleached (25 lb. up)	12.75 to 13.25
Unbleach. (25 lb. up)	11.50 to 12.00
Greaseproof—	
Bleach. (25 lb. up)	11.00 to 11.50
Unbleach. (25 lb. up)	10.00 to 10.50

News—OPA Ceilings	per ton
Rolls, Standard (Contract)	58.00
Rolls, Lightweight (Cont.)	62.00
Rolls (Spot)	(nominal)
Sheets	66.00

Tissues (Carlots)—	per ream
White, No. 1	1.12½ to 1.20
White, No. 2	1.00-
Bleached Anti-Tarnish	1.15-
Colored	—
Anti-Tarnish Kraft	.70-
Manila	.90 to .95
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.60-
Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs.	.60-
Toilet, Bleached (M shts.) per cs.	5.55-
Toilet, Unbleached (M shts.) per cs.	4.25-

Towels—	per case
Bleached	3.20 to 3.75
Unbleached	2.60 to 3.00

Wrappings (Kraft)—	per cwt.
Super-Standard	5.25 to 7.00
No. 1 Wrapping	5.00 to 7.40
Standard Wrapping	4.75 to 7.15
Standard Bag	4.37½-

Wrappings (Sulphite and Bleached Kraft)— (Rolls, f. o. b. mill)

Bleached papers—	per cwt.
M.F. & M.G. Waxing, 20 lb. (Carloads only)	7.25 to 7.80
(10,000 lbs.)	7.50 to 7.75
Drug wrapp. 35 lb.	7.00 to 7.25
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	5.50 to 5.75
No. 1 Butchers	5.75 to 6.00
No. 1 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	6.25 to 6.50
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	6.00 to 6.25
Steam Finish, 50 lb.	5.00 to 5.25
Water Finish, 40 lb.	5.50 to 5.75

Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	6.00 to 6.50
Envp. Mla., Sub. 16-28 (No. 2)	5.75 to 6.00
Envp. Mla. (Prices based on large sheets untrim'd remarked, in bdls.)	
Wrapp. Mla. 35 lb. up—	
No. 1	6.00 to 6.25
No. 2	5.75 to 6.00
M. G. Sulphite and Kraft (other than Waxing)	
Grade A-22 lb.	7.20 to 7.40
Grade B-30 lb.	6.75 to 7.00

UNIVERSAL SAFETY

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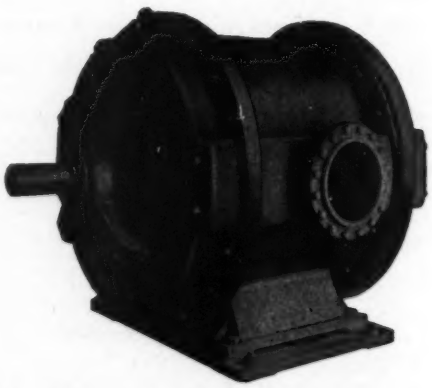

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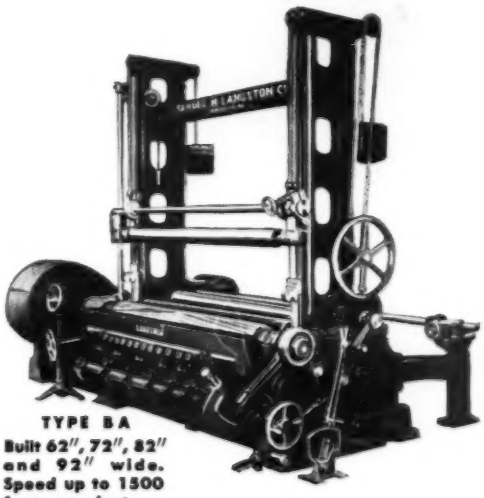

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